U. S. DEPARTMENT OF AGRICULTURE,

BUREAU OF SOILS.

IN COOPERATION WITH THE MISSISSIPPI GEOLOGICAL SURVEY.

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# SOIL SURVEY OF SMITH COUNTY, MISSISSIPPI.



BY

W. E. THARP, IN CHARGE, AND WILLIAM DEYOUNG

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[Advance Sheets—Field Operations of the Bureau of Soils, 1920.]

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1923.

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[PUBLIC RESOLUTION—NO. 9.]

JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled*, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]

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FIGURE.



MAP.

# SOIL SURVEY OF SMITH COUNTY, MISSISSIPPI.

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## DESCRIPTION OF THE AREA.

Smith County is located in the south-central part of Mississippi, the northwest corner being about 25 miles east and 5 miles south of Jackson, the capital of the State. It is bounded on the north by Scott County, on the east by Jasper County,[1] on the south by Jones and Covington Counties, and on the west by Simpson and Rankin Counties. The outline approximates a quadrangle measuring 30 miles north and south and about 22 miles east and west. The area is 631 square miles or 403,840 acres.

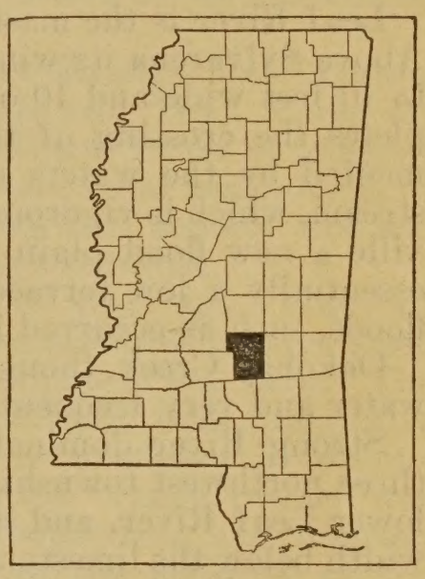

FIG. 14.—Sketch map showing location of the Smith County area, Mississippi.

Physiographically the region is a plain gently tilted toward the south. The elevations range from about 275 to 450 feet above sea level. Very complete drainage systems have developed, and the surface, for the most part, consists of interstream divides with innumerable secondary ridges. There are comparatively few isolated hills or prominent local elevations. The prevailing surface configuration in most sections ranges from rolling to somewhat hilly, but there are rather numerous local exceptions in the form of small areas of very rough country chiefly in the central and east-central parts of the county. Broken areas prevail east of Raleigh; most of the region drained by the western tributaries of upper Leaf River is very hilly, and east of West Tallahala Creek there are several square miles where the narrow ridges rise from 150 to 200 feet above the drainage ways.

Many of the main interstream divides are relatively broad and embrace several square miles of undulating uplands. The fine farming region surrounding Sullivans Hollow consists in part of uplands of this character. Some areas along the Mize-Raleigh Road have a general slope toward the southeast, and are bordered in places on the west by wooded ridges and ravines. The village of Raleigh is located on a narrow red ridge (Orangeburg soils) which widens to the south, with occasional small flat areas of excellent agricultural land.

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[1] The soil map published with this report shows some land surveyed outside the county boundary in the southeastern corner. This section lies in Jasper County, but was not included in the soil survey of that county in 1907, owing to inability to locate accurately the boundary line. The location of the boundary line in this survey is taken from Hardee's Map of Mississippi (1871), based upon the original field notes, and uniformly recognized in all State maps. The area outside the boundary line, covering about 1 square mile, is not included in the area measurement of Smith County.

Open, undulating farm lands extend south and west of Sylvarena almost to the river "swamps." North of the village the land is strongly rolling, and the divide between West Tallahala Creek and Leaf River culminates in the high red hills near Bethel Church. Farther north the relief is generally mild. The extreme northeast corner of the county includes several square miles of "flatwoods," a topographic form more extensively developed in the adjoining counties.

In the western and northwestern parts of the county rolling to moderately hilly relief generally prevails, and comparatively little land is topographically unsuited for farming.

Along the west side of lower Leaf River there are high, wide stream terraces or benches, like that on which Taylorsville is situated. Toward the north they are lower with respect to the river, less distinctly set off from the uplands, and smaller in extent.

Leaf River is the master stream of the eastern half of the county. Above Sylvarena its winding, muddy channel is hardly more than 20 to 40 feet wide and 10 or 15 feet deep, but below the village it completes the crossing of the Vicksburg limestone outcrops and, augmented by the waters of West Tallahala Creek, becomes a swift stream, which is vigorously enlarging its channel. Opposite Taylorsville a new flood plain is beginning to develop and the old one is essentially a low terrace which is reached only by extremely high floods, such as occurred in the autumn of 1919.

Oakohay Creek, though smaller than the Leaf River, carries much water and very frequently overflows its wide, flat flood plain.

Strong River dominates the drainage of the greater part of the three northwest townships. Its flow is slightly greater than that of lower Leaf River, and its channel likewise has a greater depth and width below the limestone outcrops than above them. The upper part of the channel fails to hold the floods which the lower part will carry.

All the streams are muddy, at least when at all swollen, and there is little sand and no gravel along their banks. Most of the creeks have winding channels, much obstructed by logs and other forest débris. Along the smaller branches there is usually such a thick growth of bushes and trees that the open waterway is narrow, and in places there is none, so that all overflows spread widely and drop most of their sediments quickly. In this manner sandy soils have been developed in many places where formerly a silty loam or a muck existed. The change has been greatest along the branches and little "reed brakes" surrounded by cultivated lands. The flood waters that reach the more remote parts of the creek and river "swamps" carry no sand and apparently but little silt and clay. Near the channels the changes due to floods, washing, and redeposition are very noticeable and often cause much damage.

Near Mize, Bezer, and Sylvarena, and in a few other localities, there are compact bodies of open land, but elsewhere the farms are generally small, and the fields are irregular and more or less isolated by patches of woods and the dense brush along the drainage ways. In the more rolling sections there are numerous old fields covered with sedge grass and reverting to a shortleaf-pine forest.

The areas of cut-over land range from small patches to tracts of many square miles, broken only by wooded branch bottoms and an occasional farm or small settlement. On the recently logged-off lands little remains except the stumps and trees under 6 or 8 inches in diameter. In the areas worked a few years ago the blackened stumps and old logs left by forest fires are hidden to some extent by sedge grass and black-jack saplings. The earlier logging operations left much of the inferior timber and all the sapling pine, so that these areas are now occupied by a rugged, uneven forest in which there is less scrubby oak than on recently cut-over lands. On the latter the sedge grass comes in very thickly, but yields in a few years to the scrubby oak, which in places is so thick that the grassy undergrowth is small and thin. There are few pine seedlings anywhere. This is the result of destruction by annual forest fires, augmented to some extent by the damage done by hogs and the failure of the lumbermen to leave enough seed trees.

There is much virgin longleaf pine between Raleigh and Trenton, and several thousand acres between Pineville and Ted. These are the only large tracts remaining of the magnificient forest of longleaf pine which formerly covered most of the uplands and bench lands of the county. The river and creek bottoms are still densely wooded, but much of the merchantable timber has been removed.

The earliest settlements were made about 90 years ago. Many of the pioneers came from the Carolinas and a considerable number from Georgia. For many years agricultural development was slow. The clearings were small, improvements rude, and there were practically no roads. Cotton was the cash crop and was marketed in Mobile. Cattle and hogs subsisted almost entirely on the "range," which was better at that time than in later years. Woodcutting and hunting afforded a considerable part of the living of the majority of the people. There were a few large plantations on Leaf and Strong Rivers, but none of these estates were very well improved.

During the last 50 years there has been little emigration or immigration. The extension of the cleared lands has been due to a marked degree to younger members of families acquiring small land holdings. Naturally the most desirable lands were taken first, practically all the smoother areas of Orangeburg soils being occupied many years ago, and the later clearings consist chiefly of the smoother Ruston soils. The heavy types, such as the Susquehanna, Oktibbeha, and some of the Kirvin soils, have not been improved on account of the difficulty in handling such soils with light equipment.

This development was interrupted to some extent 25 or 30 years ago, when lumber companies invaded the region. Most of the people sold their forested lands at ridiculously low prices—a few dollars an acre. Later transfers were at somewhat higher prices, but both lands and timber were soon beyond control of the people. So complete has been the transfer of the pine lands that very few farmers have any timber other than hardwoods and the inferior shortleaf or second-growth pine for farm improvements.

There are many small sawmills, but all the large plants are located outside the county. The railway from Mize to Cohay is

a well-built log road, but no permanent lines have been constructed into the central or northern parts of the county.

The main roads follow the divides as far as practicable and avoid the low grounds. Much money is annually spent for this road building, but the friability of the upland soils, the heavy clay spots exposed in shallow cuts on the slopes, and the yielding character of the creek-bottom types, render road construction a rather difficult problem. The main roads are traversable for automobiles and trucks, but the secondary roads have many places difficult for machines to cross.

Consolidated schools have absorbed nearly all the one-room rural schools. The county agricultural high school is located at Mize. Rural telephone lines are numerous, and several star routes insure daily mail deliveries to each of the inland towns and villages.

Raleigh is the county seat. Mize and Taylorsville are the chief distributing points for the southern and central parts of the county. The residents of the northern part patronize towns on the Alabama and Vicksburg Railway in Scott County. Cohay is a log-loading station and local headquarters for one of the large lumber companies, and a local market for considerable farm produce.

The total population of the county in 1920 was 16,187, all classed as rural.

## CLIMATE.

The long summers, short, mild winters, and abundant rainfall have favored the development of a varied native flora and admit of the production of a wide range of cultivated crops. The periods of low temperature usually last only a few days, and the occasional snowfalls are very light. The average date of the first killing frost in the fall is November 1, and of the last in the spring March 21. The latest recorded in 30 years occurred on April 10 and the earliest on October 13. Peach, plum, and pear trees are often in bloom on March 1 and apple trees a little later. About this date much of the native vegetation is well started, and by March 15 Bermuda grass and carpet grass in sunny locations afford some grazing.

Ordinarily a good deal of field work can be done during January and February. Occasionally corn is planted the latter part of February, but as a rule the first planting is done the latter part of March and the last planting may be delayed until the middle of June. All cotton is planted as early as practicable, usually early in April.

The precipitation during May, June, July, and August averages nearly 5 inches per month in normal seasons. On all except the lightest soils this is more than enough for practically all crops. A deficiency, if not too great, during this period is far better than an excess. Cotton growers welcome hot, dry weather during July and August, as an assurance of a minimum injury by the boll weevil. In 1918 a very satisfactory cotton yield, 8,038 bales, was obtained under conditions of somewhat deficient and irregular rainfall, while in 1919 an excess of rain and more than the usual number of cloudy days resulted in a crop of only 5,237 bales.

The following table, compiled from the records of the Weather Bureau, gives the monthly, seasonal, and annual temperatures and

precipitation at Lake, situated in Scott county a few miles from the Scott-Smith County boundary line:

*Normal monthly, seasonal, and annual temperature and precipitation at Lake, Scott County.*

[Elevation, 446 feet.]

| Month. | Temperature. | | | Precipitation. | | |
|---|---|---|---|---|---|---|
| | Mean. | Absolute maximum. | Absolute minimum. | Mean. | Total amount for the driest year (1899). | Total amount for the wettest year (1898). |
| | °F. | °F. | °F. | Inches. | Inches. | Inches. |
| December | 46.5 | 78 | 9 | 4.53 | 4.04 | 3.05 |
| January | 46.6 | 76 | 10 | 4.70 | 8.71 | 7.79 |
| February | 47.2 | 81 | 10 | 5.69 | 2.94 | 2.40 |
| Winter | 46.7 | 81 | 9 | 14.92 | 15.69 | 13.24 |
| March | 56.7 | 90 | 24 | 4.86 | 3.75 | 5.38 |
| April | 63.8 | 92 | 32 | 4.40 | 0.69 | 3.36 |
| May | 71.1 | 98 | 36 | 4.64 | 3.65 | 1.84 |
| Spring | 63.8 | 98 | 24 | 13.90 | 8.09 | 10.58 |
| June | 77.8 | 102 | 47 | 4.75 | 3.68 | 6.09 |
| July | 79.9 | 100 | 55 | 5.36 | 8.95 | 11.17 |
| August | 79.3 | 103 | 54 | 4.70 | 4.05 | 7.87 |
| Summer | 79.0 | 103 | 55 | 14.81 | 16.68 | 25.13 |
| September | 74.7 | 98 | 39 | 2.86 | 0.80 | 5.70 |
| October | 62.8 | 93 | 22 | 2.05 | 0.95 | 2.60 |
| November | 53.5 | 85 | 20 | 2.68 | 1.06 | 6.30 |
| Fall | 63.6 | 98 | 20 | 7.59 | 2.81 | 14.60 |
| Year | 63.3 | 103 | 9 | 51.22 | 43.27 | 63.55 |

## AGRICULTURE.

From the early settlement to the present time cotton and corn have been the important field crops. A considerable number of other farm products are regularly grown, but all of them taken together are not as important as either one of the two staples. Cotton is the chief cash crop and corn is the principal feed and subsistence crop. Sweet potatoes, sugar cane for sirup, the more common kinds of garden vegetables, and some tree fruits are regularly produced on practically every farm, but do not, except in a small way, contribute to the cash income.

The following table, compiled from census returns, shows the acreage and production of the principal crops:

*Acreage and production of principal crops, 1879 to 1919.*

| Year. | Cotton. | | Corn. | | Oats. | | Sweet potatoes. | | Hay and forage. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Acres. | Bales. | Acres. | Bushels. | Acres. | Bushels. | Acres. | Bushels. | Acres. | Tons. |
| 1879 | 10,543 | 3,721 | 14,614 | 156,952 | 5,000 | 46,959 | 564 | 65,681 | 15 | 12 |
| 1889 | 18,335 | 7,601 | 19,600 | 279,899 | 3,646 | 32,739 | 726 | 46,124 | 11 | 11 |
| 1899 | 21,109 | 9,302 | 26,529 | 411,760 | 2,518 | 20,440 | 594 | 38,076 | 671 | 744 |
| 1909 | 26,039 | 10,804 | 22,805 | 274,295 | 4,353 | 47,897 | 865 | 70,891 | 2,751 | 3,022 |
| 1919 | 21,923 | 5,673 | 30,396 | 400,346 | 2,483 | 31,322 | 1,377 | 131,725 | 4,193 | 3,631 |

The increase in the acreage of corn and cotton is due to extension of the cleared ground and increase in number of farms. In the opinion of many farmers the average yield of corn is higher than formerly, owing to better methods of tillage. This was also true of cotton until the appearance of the boll weevil in 1911–12. Oats are not grown at all on many farms, and a field anywhere of more than 10 acres is quite exceptional. Low oat yields due to adverse seasonal conditions, late seeding, and imperfect preparation of the seed bed are common.

Tame hay of various kinds is receiving more consideration than formerly, but the acreage would be totally inadequate if live stock were more properly cared for during winter months. Fodder or corn blades gathered by hand and tied in bundles supplement the allowance of feed for work horses and mules on many of the small farms.

Nearly all farmers own at least a few head of cattle, the free range rendering their upkeep comparatively inexpensive. With the exception of the larger landowners and a very few men who make a practice of buying young cattle and feeding them a short time, the income from this source is usually small. The market is chiefly local. Dairying has not been developed. On most farms the sale of poultry and eggs exceeds the income from butter.

The cost of raising hogs is low. In some seasons the "swamps" afford a great deal of mast, such as beechnuts and acorns.

Many years ago there were considerable numbers of sheep and they did well. But now the necessity in most instances of confining them to pastures, the almost universal presence of cockleburs in all low-ground fields, the prevalence of animal parasites, and the innumerable dogs render sheep raising unprofitable, notwithstanding the abundance of free pasturage. There are more goats than sheep in the county at present. The common goat requires very little care. A somewhat unsuccessful attempt has been made to increase their value by crossing with the Angora.

Comparatively few horses and mules are raised, most of those in use on farms being obtained from other States.

The 1920 census gives the value of farm products for 1919 as follows:

*Value of farm products in 1919.*

| | Dollars. | | Dollars. |
|---|---|---|---|
| Cereals | 775,680 | Live stock and products—Continued. | |
| Other grains and seeds | 24,015 | Dairy products, excluding home use | 124,945 |
| Hay and forage | 89,580 | Chickens and eggs produced | 125,965 |
| Vegetables | 396,251 | Honey and wax | 5,243 |
| Fruits and nuts | 54,860 | Wool produced | 949 |
| All other crops (including cotton) | 1,383,101 | | |
| Live stock and products: Animals sold and slaughtered (estimated)[1] | 403,113 | Total | 3,383,702 |

The 1920 census reports the following live stock on farms on January 1 of that year: Horses, 1,704; mules, 3,313; cattle, 17,625,

[1] Not reported in 1920 census.

of which 4,457 were beef cattle and 13,078 dairy cattle; sheep, 1,588; goats, 3,936; and swine, 25,381. The total value of all domestic animals is given as $1,221,557.

The value of all property per farm is given as $2,101, 52.3 per cent of which represents the value of the land, 19.7 per cent the value of the buildings, 5.2 per cent the value of implements and machinery, and 22.8 per cent the value of live stock.

It is comparatively easy for the farmers, even those of very limited means, to make a comfortable living. The free range for live stock, the great variety of products which can be grown, the fuel to be had for the labor of getting it, and the low cost of a house that is comfortable in this climate render actual living expenses very low. A satisfactory cash income is difficult to obtain, particularly when cotton is a poor crop or the price is low. Only a small number of farmers sell enough live stock or any other farm product to make a satisfactory return for the year's labor and expenses. This condition has been accentuated by recent increases in prices of supplies, and also by the heavier taxes levied for improvement in roads and schools.

All farmers recognize the adaptability of the darker colored alluvial soils for corn and of the lighter colored soils to lespedeza and to sugar cane for sirup making. The Orangeburg fine sandy loam is considered excellent for general farming, and the most of the smoother Ruston areas are considered of nearly equal value. The superior value of pasturage on the heavier types, particularly the Oktibbeha clay and Houston clay, has long been recognized. Under existing conditions ease of tillage and economy in labor are factors of equal importance with inherent fertility. "Fresh land" or land recently cleared is esteemed for its almost unfailing productiveness, but the fact that this is due to the content of organic matter in the surface soil is not so generally recognized. The wasteful practice of burning stalks and trash is still too common.

Flat breaking of ground for corn and cotton is not practiced, except to some extent on the smoothest lands, and even there the fields are bedded and the seed planted on the ridges. In the subsequent cultivation care is generaly taken to leave at least a slight ridge. On the smoothest types this is not always done, particularly if a catch crop of any kind is planted between the rows. Contour cultivation is the common practice, and terracing is far more general than was the case 10 or 15 years ago. The Mangum terrace has not been adopted, although heavy and efficient "balks" are made in many instances.

On the great majority of farms the field equipment includes a small 2-horse plow, a middle buster, and a number of 1-horse cultivators with various sized shovels. A "gee-whiz" harrow or light spring-tooth cultivator is a favorite implement on the lighter soils. Mowers and 1-horse hay rakes are in common use, but very little improved harvesting or haying machinery is used. More 2-horse implements are used on farms consisting of level land, but on most of the farms the heavier equipment could not be advantageously used. The small size of fields, the necessity of laying rows according to the contours of the ground, and very generally inclusion of some

"stump ground" on new land have resulted in the general adoption of the lighter and simpler implements.

No systematic rotation of crops is practiced. Most farmers avoid planting corn on the same ground for more than two years in succession, except on overflowed lands. On upland soils two or three successive crops often result, it is said, in a diseased condition of corn. White varieties of corn are grown exclusively.

Since the advent of the boll weevil early varieties of cotton have been used, including Half-and-Half, Kings Improved, and others.

The conventional farm house is a low, unpainted wooden structure, with a large outside chimney at each end, and a gallery (porch) along the entire front. An open hall through the middle affords easy access to the rooms on each side and the kitchen in the rear. The clean-swept front yard (grass is never encouraged), with its cape jasmine and rose bushes, is invariably paled in with boards, for all stock runs at large throughout the year. The outbuildings are cheaply constructed, and in most instances inadequate for the storage of hay and such protection of live stock as the winter season really demands.

Better farm houses are gradually increasing in number, but not to the same extent as in the villages. Wire fencing is quite rapidly displacing the rail fence.

Forty years ago very little commercial fertilizer was used. At a somewhat earlier period cotton seed was often distributed on cotton and corn ground, but there was much waste of this material. The use of commercial mixtures has steadily increased. Of a total number of 2,818 farms in 1909, about 75 per cent, or 2,163, reported using nearly $83,000 worth. Similar figures from 1919 census are hardly comparable on account of the difference in prices. The cost of fertilizers in 1919 on 1,595 farms reporting their use was $83,821, or an average of $52.55 per farm. The use of acid phosphate is steadily increasing, and mixed fertilizers or those with acid phosphate and potash or acid phosphate and some nitrogen, are growing in favor. Barnyard manure is the source of most of the nitrates. A considerable number of farmers compost all manure obtainable with leaves and pine straw. The lack of straw or hay to form an absorbent is one cause of meager quantities of barnyard manure and occasions the loss of much of the liquid manure.

All cotton seed is sold, and although considerable quantities of the meal and hulls are purchased for feed, the total amount of fertilizing constituents from this source which is finally returned to the fields is small.

The velvet bean, introduced some years ago, is now grown by almost every farmer, and is a great aid in the maintenance of soil fertility. Planted between the hills of corn or in every third row, this crop does well on almost all types and under a wide range of seasonal conditions. Part of the crop is commonly gathered by hand for seed, but the remainder and the vines are usually pastured with the corn stalks. Cowpeas are quite extensively grown, but are not in such favor as velvet beans. Soy beans have been grown experimentally, but have not come into general favor.

Except on the larger farms, the outlay for labor is comparatively small. On the great majority of farms the work is done by the family. In some neighborhoods colored labor is available,

but the scanty colored population has generally preferred share renting, or employment on highways, in the loading camps, or in the lumber mills in near-by towns. The census figures for 1909 show an average expenditure of less than $60 per farm for hired labor. According to the census a total of $25,928 was expended for labor in 1919 on 351 farms, or an average of $73.87 per farm.

The number of all farms is given as 2,695, with an average size of 84.5 acres, of which 33.8 acres is classed as improved land. Of the total area of the county, 56.8 per cent is in farms, and 40 per cent of the farm land is improved.

As the census lists each tenancy as a farm, the figures given are somewhat misleading as to size of the individual holding. But the great majority of farms are of moderate acreage, including the pasture and uncleared land. Many of the farms contain 40 or 80 acres, or 160 acres. Large estates, except the lumber companies' holdings, are not numerous. The cultivated ground which can be handled by one man is between 20 and 25 acres, planted to the following crops: Eight to ten acres of corn, about the same or less of cotton, 2 or 3 acres of oats, and a few acres in sweet potatoes, sugar cane, and other small crops.

Of the 2,695 farms in the county, 71.4 per cent are operated by owners and 28.6 per cent by tenants. White tenants constitute 72.5 per cent of the total number of tenants. The usual rent is one-fourth the cotton, including the seed, and one-third the corn. Tenant houses are usually small, and the other buildings are very cheaply constructed. There has been a decrease in tenancy in recent years.

## SOILS.[2]

Smith County lies well within the Coastal Plain region of the South, and it is on the northern border of the longleaf pine belt of the State. The predominant soils have the common designation "piney woods lands," while the less extensive areas of heavy, clayey types are locally called "prairies," although now densely wooded.

Geologically the parent or soil-forming materials of this region are designated as Tertiary.[3] The Vicksburg limestone outcrops on Strong River below Trenton and along Leaf River from its confluence with West Tallahala Creek to a point several miles above Sylvarena. South of this are the noncalcareous clays, sandy clays, and sands of the geological formation known as the Grand Gulf formation. North of the Vicksburg limestone exposures there are deep beds of clay, more or less calcareous, which are the upper members of the Jackson clays and sands.

All of the region has been elevated above sea level a very long time, and much material has been removed by erosion and solution.

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[2] There are some discrepancies between the Ruston and Orangeburg soils along the boundary between Simpson County and Smith County in the rolling country north of Hatchapaloo Creek. The Orangeburg and Ruston soils grade into each other in many localities in such a way that it is frequently impossible to draw satisfactory boundaries between them. This is especially true in rolling country of the kind referred to here. There is also some failure to join up with Jones County on the south, but the two areas in their essential parts join up fairly well. The principal areas along the boundary with Covington County also join up fairly well, but there are some failures to join in some of the minor types in the stream bottoms.

[3] All references to geology in this report are based upon reports of the Mississippi Geological Survey.

Erosion has developed the wide, shallow valleys of the larger streams, and the elaborately branched systems of tributary valleys. Owing to the soft character of the materials on which this erosion is taking place, comparatively mild surface features prevail throughout most of the region. The limestone gives rise to a few low bluffs on the rivers, and beds of friable material are deeply cut by drainage ways in places, but in general rounded ridges with long slopes and wide flats are the prevailing forms of relief.

The mild surface configuration has favored rather deep action of leaching, solution, oxidation, and other agencies of weathering. On the crest of ridges, and particularly on the wider interstream divides, where the surface layer is sandy, oxidation has taken place to a depth of several yards.

Wherever heavy semi-impervious clays occur the comparatively unaltered bedding planes of the original deposits are revealed in shallow road cuts, but the surface layer has suffered much modification in color, texture, and mineralogical composition. All the gradations in depth and character of the weathered layer may be found within very small areas. Local conditions with respect to topography, drainage, and structure of materials have determined in a large measure the character of the soils. There is also a marked tendency toward uniformity under the same local conditions, regardless of original differences in the character of the materials. Soils without a trace of lime carbonate, as determined by simple field tests, may be derived from either very calcareous deposits or from those originally deficient in lime.

The subsoil colors of solid red, brown, and yellow have developed only where good but not excessive drainage has prevailed. Light grays and drabs invariably result from long seasonal periods of saturation, while mottled subsoils indicate more or less obstructed or sluggish movement of the soil moisture.

To what extent the original stores of potash, phosphorus, lime, and other mineral elements of soil fertility have been removed can not be stated, but undoubtedly much change has taken place in the more thoroughly weathered materials. The absence of lime in the Grand Gulf formation where exposed within this county, the highly siliceous character of the sands and gravel, and the appearance of the clays, indicate a relatively low content of the mineral elements that make for soil fertility. Of such origin are the soils of the Orangeburg, Susquehanna, Ruston, and Caddo series in this county.

The Vicksburg limestone is the parent material of the Oktibbeha soils and very small areas of Trinity clay and some of the Houston clay. But the presence of sands and clays, evidently remnants of the Grand Gulf formation, along the line of the exposures of the Vicksburg formation, greatly increase the soil variations in that locality. No doubt there are also marginal differences in the strata associated with the Vicksburg, which further complicate the resultant soils, and may explain the occurrence of the Kirvin soils in this immediate region and for some distance to the north. These heavy types are marked by peculiar reddish-brown colorations and an abundance of ferruginous material, and certain properties of the heavier soils suggest a clay derived from calcareous deposits, although no free lime remains.

Along the northern boundary of the county, east of the valley of Talla Bogue, calcareous clays of the Jackson formation prevail. The soils, where unmodified by any overlying materials, are the extremely tenacious, adhesive clays of the "flatwoods." South of this typical "flatwoods," in the hilly country west of the Leaf River, there is just such a complex of types as would result if the Jackson clays of that section had been covered with a rather thin stratum of sand and subsequent denudation had removed all the sand except that on the tops of the main divides and cut rather deeply into the underlying clays. This is the present relationship of types in various sections of the central and northern parts of the county—deeply oxidized sands on the higher ridges, with shallow sandy loams over clay subsoils on the lower slopes. On many slopes the soils are rather heavy variations of the Ruston soils, having friable, yellowish-red sandy clay subsoils, but there are also great developments of Susquehanna and Kirvin types, having shallow sandy surface soils over a heavy sticky clay, in places highly ferruginous.

In the southern part of the county this relationship is not so clearly apparent. The Orangeburg types commonly occur on the interstream divides, but in places the Ruston types occupy similar positions. The general distribution of the Orangeburg, Ruston, and Susquehanna types in this section suggests textural differences in parent materials as the chief factor, with drainage next in importance.

The heavy forest, which doubtless has occupied this region for a very long time, has contributed but little humus to the soils. The heavy annual rainfall, the high average temperatures, and the absence of deep freezing all hasten the reduction of the supply of organic matter when the land is brought under cultivation. The same factors favor the removal of the more soluble mineral elements, as the rock fragments (soil particles) succumb to weathering.

In the following brief summary of the series represented in the county, color is not emphasized as an essential feature in itself, but as an infallible indication of processes that are important in soil development and largely determine agricultural values.

The Orangeburg series is characterized by a brick-red friable sandy clay subsoil, and the Ruston by a reddish-yellow to yellowish-red subsoil usually less friable than that of the Orangeburg. The Susquehanna series may be known by its highly tenacious subsoil, red or mottled red and yellow above, with conspicuous mottling below, in which light gray or bluish gray becomes the dominant color.

The Kirvin soils are intermediate between the Orangeburg and Susquehanna, with red to brownish-red subsoil of less adhesive clay than in the Susquehanna. In many places an abundance of ferruginous material is present in the Kirvin.

The Caddo soils have a pale-yellowish subsoil, indicative of obstructed underdrainage.

The Oktibbeha soils, which are direct derivatives of the Vicksburg limestone, are characterized by a sticky red to reddish-yellow subsoil, with a tendency to granular structure in relatively dry exposures, differing from that of clays of noncalcareous origin.

The Montrose series has a dull-yellow subsoil passing below into exceedingly tenacious clay of lighter color. The soils of the Greenville series have red to brownish-red surface soils and a bright-red to red compact but friable sandy clay subsoil. The surface soils of the Houston series are dark gray to almost black. The subsoil is a dark to greenish-yellow plastic clay, highly calcareous. Frequently the rotten limestone is reached within the 3-foot section.

The Cahaba series includes the well-drained soils of the higher terraces or stream benches. The subsoil is yellowish red to red as a result of good drainage and aeration. This material represents old stream deposits. The Kalmia soils are pale yellow in the subsoil, owing to their flat topography. They also occur on stream benches, which formerly, before the streams had cut their channels down to the present level, were subject to overflow. The Myatt series resembles the Kalmia, except in the lighter gray color of the soil and the more intensely mottled light-gray or bluish-gray and yellow subsoil and poorer drainage. They, too, occur on former stream flood plains.

The Leaf series is another stream-bench group of soils. The types of this series have heavy clay subsoils, usually mottled red and yellowish or red, yellowish and grayish.

The recent-alluvial soils include four important series. The Ochlockonee soils are brown with a light to yellowish subsoil, mottled in places with gray in the lower part. The Bibb soils are very light colored throughout the entire 3-foot section, with frequently mottled whitish or bluish gray and pale yellow subsoils. The soils of the Catalpa series are dark gray to brown and have a mottled gray and brown clay subsoil. They are developed in the first bottoms of streams flowing through areas of limestone soils. The Trinity series is characterized by black heavy surface soils and a black or steel-gray, plastic, heavy subsoil. These are developed in the first bottoms of streams.

*The cut-over lands.*—Four lumber companies which have large holdings in this part of the State own a total of about 140,000[4] acres in Smith County. Several thousand acres of these lands in the northwestern part of the county, also a large tract east of Pineville, consist chiefly of virgin longleaf pine, and a somewhat larger acreage is covered with a mixed growth of longleaf and shortleaf pine, with more or less hardwood. The greater part, however, has been denuded of all timber of commercial value.

The present appearance of these cut-over lands has been described in previous pages. No comprehensive plan for the future management or disposal of these lands has been announced by any of the companies. They are yielding no financial returns. The rates of taxation have increased greatly in recent years, owing to the county's increased expenditure for roads, consolidated schools, and continuance of the compulsory dipping of all cattle in the effort to exterminate the Texas fever tick.

In order to facilitate the settlement of these lands, some segregation of the tillable from the nontillable areas seems desirable. Much local road building will be necessary. In order to favor people of limited means, very liberal terms of purchase must be given. The

[4] An estimate made by officials in the sheriff's office at Raleigh.

distance from markets and the lack of local demand for truck, fruit, and other minor crops is at present a serious consideration. These drawbacks are offset in part by the free range for livestock and the cheapness of fuel and building materials. But even under most favorable conditions, the development of a farmstead on stump land requires much time and labor.

The cut-over lands include many of the smoother areas of the Ruston fine sandy loam, which is excellent land for general farming. There is much of the mixed Ruston and Susquehanna fine sandy loams and considerable Caddo fine sandy loam east of Pineville. In the western and northern parts of the county the Ruston soils commonly prevail in the longleaf pine areas. Very little of the cut-over land consists of smooth areas of Orangeburg fine sandy loam, but rolling to hilly spots of this type are of common occurrence. In the northern part of the county some of the Kirvin soils and small areas of Susquehanna clay and Montrose clay are embraced in the timber holdings. The mixed Orangeburg and Susquehanna fine sandy loams include only small acreages smooth enough for farming, but much of this land makes good pasture.

The cost of removing stumps from land has been variously estimated at from $10 to $20 per acre. The latter figure is doubtless more nearly correct. If the scrub oak and small pines are removed, quite satisfactory tillage may be given cotton, corn, and some other crops among the large stumps; and, as a matter of fact, considerable cotton and corn is grown throughout the South on freshly cleared land without the removal of the stumps. Formerly this was true of corn to a greater extent than of other crops. Cultivation under these conditions is more arduous and less efficient per unit of man and horse power; nevertheless, some good yields are obtained on this stump land, and even between the dead trees of "deadenings", where the small trees are chopped out and the larger ones killed by girdling, but where neither roots nor stumps are removed. The stumps can be burned out, and this method is probably the cheapest one yet devised. A horse-power stump-puller will bring out the largest pine stump, but its subsequent disposal is not a simple task.

On the lands cut over some years ago there is more or less small timber remaining, enough in many instances to provide posts and some rough building material. In the branch bottoms there may be consderable gum, beech, oak, and an occasional large pine tree. On the recently logged-off lands very little timber remains. There is an abundance of firewood, but this is rapidly being wasted by the annual burning of the thick stand of broom sedge which soon covers all deforested land. These fires destroy the seedling longleaf pines which otherwise would occupy much of the lighter soils. On the heavier types there are few or no old longleaf pines and practically no seedlings.

The pasturage value of the average acre of deforested upland is low, since the grass consists largely of coarse varieties which are not relished by stock except in the earliest stages of growth. Carpet grass and some other very desirable varieties occur on the low grounds, and spread over cleared land where not retarded by fires, which encourage the growth of broom sedge and retard the growth

of both carpet grass and lespedeza. There is little or no Bermuda grass or lespedeza, except in old fields or spots where the native vegetation has been entirely eradicated. The brushy, shrubby growth of the branch bottoms affords much of the pasturage in these locations.

Practically all the rougher lands are far better adapted to forestry than to agriculture and much of the imperfectly drained land could undoubtedly be better used for the reestablishment of pine forests by protection from their great enemy, the annual fire. A considerable part of the recently cut-over land, that most remote from transportation, probably could be profitably utilized by encouraging reforestation, since not all of it is likely to be needed for farmsteads for many years. The prevention of forest fires, which is the chief factor in the reforestation of this region, will also cause an increased growth of the more desirable grazing plants, lespedeza and carpet grass. Forestry and cattle raising coordinate perfectly in the southern pine belt.

In the following pages of this report the different soils in Smith County are described in detail and their relation to agriculture discussed. Their distribution is shown on the accompanying soil map. The actual and relative extent of the different soil types mapped are given in the table below:

*Areas of different soils.*

| Soil. | Acres. | Per cent. | Soil. | Acres. | Per cent. |
|---|---|---|---|---|---|
| Ruston fine sandy loam | 86,592 | | Bibb clay | 6,912 | 1.7 |
| Rolling phase | 51,904 | 37.6 | Montrose clay | 6,208 | 1.5 |
| Mixed phase | 12,928 | | Ochlockonee fine sandy loam | 5,760 | 1.4 |
| Light-textured phase | 192 | | Caddo fine sandy loam | 4,864 | 1.2 |
| Orangeburg fine sandy loam | 46,592 | 18.9 | Susquehanna fine sandy loam | 4,480 | 1.1 |
| Rolling phase | 29,952 | | Houston clay | 4,096 | 1.0 |
| Bibb silt loam | 20,864 | 5.2 | Oktibbeha clay | 4,032 | 1.0 |
| Ochlockonee silt loam | 20,416 | 5.1 | Cahaba very fine sandy loam | 3,392 | .8 |
| Orangeburg and Susquehanna fine sandy loam (undifferentiated) | 16,320 | 4.0 | Susquehanna clay | 3,136 | .8 |
| | | | Montrose fine sandy loam | 2,816 | .7 |
| | | | Myatt fine sandy loam | 2,432 | .6 |
| Kalmia very fine sandy loam | 9,536 | 3.7 | Ochlockonee silty clay loam | 2,432 | .6 |
| Low-terrace phase | 5,056 | | Leaf loam | 1,728 | .4 |
| Kirvin clay loam | 13,888 | 3.4 | Catalpa clay loam | 1,600 | .4 |
| Kirvin fine sandy loam | 8,832 | 2.3 | Cahaba loam | 1,344 | .3 |
| Stony phase | 64 | | Trinity clay | 640 | .2 |
| Bibb fine sandy loam | 8,192 | 2.0 | Greenville loam | 448 | .1 |
| Ruston and Orangeburg fine sandy loam (undifferentiated) | 8,128 | 2.0 | Total | 403,840 | |
| Ruston and Susquehanna fine sandy loam (undifferentiated) | 8,064 | 2.0 | | | |

RUSTON FINE SANDY LOAM.

In its typical development in virgin areas the surface soil of the Ruston fine sandy loam consists of 1 to 2 inches of moderately dark gray loamy fine sand, containing considerable organic matter, resting on a subsurface layer of pale-yellow very friable fine sandy loam extending to a depth of 8 or 10 inches. The subsoil is a yellowish-red rather friable fine sandy clay loam which passes at about 10 to 14 inches into reddish-yellow or yellowish-red (dull red) friable fine sandy clay, and at about 24 to 28 inches depth into a slightly lighter colored, yellowish-red fine sandy loam or fine sandy clay loam. The lower subsoil may be quite compact in its natural position, even though containing less clay and more sand than the upper subsoil, but it is not impervious. The structure permits of

relatively free aeration and an easy movement of subsoil moisture. In places the lower subsoil is somewhat mottled, the colors being yellow, yellowish red, and reddish yellow, with a little gray in some instances.

In cultivated land the exhaustion of the meager content of humus and the mixing of the soil results in a light brownish gray or pale yellowish gray surface soil.

In flat spots on the uplands, and on very slightly inclined lower slopes, the surface soil generally has a distinctly grayish cast, and the subsoil usually has a paler yellow color, with gray mottling in the lower part, indicative of slower underdrainage than in the more rolling areas. On the more pronounced slopes and along the crests of rather sharply rounded ridges the better drainage and deeper aeration are evident in the prevalence of yellowish red in the subsoil, and the surface soil is brownish rather than grayish. For most crops these more reddish variations are preferable to the more yellowish ones, although the difference in content of plant food is probably very slight, or may be in favor of the latter soils, since, apparently, they have suffered less erosion and leaching.

The soil and subsoil are inclined to be acid, and there is no indication of alkalinity in the substratum, in which, however, oxidation has been effective to a depth of several yards, particularly in the more sandy materials. Variation of color along joint planes and mottling of many different colors, ranging from light gray through various shades of yellow and brown to dull red, are usually revealed in all deep road cuts. Iron concretions are not generally abundant, though in some of the poorly drained spots they appear in noticeable quantities.

In some of the forest areas there is a gray layer of fine sandy loam, from an inch to 2 or 3 inches deep at the surface, and in some cultivated fields there is a gray or brownish-gray surface layer 3 to 5 or 6 inches deep. In places the clay comes within 5 or 6 inches of the surface, and in such areas of shallow soil the texture is commonly heavier than where the clay lies deeper, being a heavy fine sandy loam, a very fine sandy loam, or a loam. On many slopes the depth to clay is deeper than over the higher areas, the looser, less clayey material locally extending to depths of 16 or 18 inches. There are also places where the surface layer is a light-gray to white loamy fine sand or a fine sand, but this grades quickly into yellowish loamy fine sand or fine sandy loam. Small gravel, consisting mainly of rounded chert, is found in places on the surface and throughout the soil and subsoil. The largest of these gravelly areas are shown with gravel symbol.

The topography ranges from undulating to very gently rolling. There are necessarily included some sharp slopes and nontillable areas along the small drainage ways, but in most localities fully 90 per cent of the land is suitable for farming. The original forest cover consisted chiefly of longleaf pine, with some oak and hickory.

Between Taylorsville and Oakohay Creek and thence for several miles north of the Gulf & Ship Island Railroad the Ruston fine sandy loam forms a wide area of gently rolling uplands with many wide swales. Most of this has been recently cut over, and there are only a few farms. The soil, particularly to the south of the railroad,

is a very fine sandy loam, with subsoil somewhat heavier than the average of the type. Spots of Susquehanna or Caddo soils occur on many of the lower slopes, and there are not many quarter sections that do not include at least a small spot or a few acres of Caddo soil. They are hardly noticeable now, but under tillage will become apparent by reason of their lighter color and slow drainage.

East and northeast of Taylorsville the Ruston fine sandy loam has rather strong relief, and the variations from the type tend toward the red Orangeburg soils, of which many patches occur on the higher divides. Some spots of Susquehanna clay are found in almost every square mile.

Near Sylvarena some areas are very generally underlain by a relatively heavy subsoil, which in places approaches a hardpan and as a rule contains much concretionary material in the lower part. These areas are late in coming into condition for tillage. They represent inclusions of Pheba fine sandy loam, not mapped separately on account of their small extent.

Throughout the northeastern part of the county the Ruston fine sandy loam is generally associated with the Caddo and Kirvin soils and includes some areas of those soils. As a rule the drainage here is somewhat slow and consequently the land is less desirable for cotton than the average of the type.

A large part of the Ruston fine sandy loam is in cultivation, particularly in the southern and central sections of the county. It is a light soil, easy to till, and responds well to commercial fertilizers and to other means of maintaining fertility. There are many spots where artificial drains are necessary, but in general the usual methods of terracing and "bedding" land insure good drainage.

In seasons of moderate rainfall and average temperature the yields of cotton range from one-half to 1 bale per acre. Commercial fertilizer, chiefly acid phosphate, is applied at the rate of 200 to 300 pounds per acre. With a moderate use of barnyard manure or some other nitrogen carrier, corn yields from 15 to 20 bushels per acre, but with heavier fertilization the yields are correspondingly increased.

It is a safe soil for fall-sown oats, as less injury is suffered from "heaving" than on the heavier soils, and the good drainage ordinarily prevents any serious injury from winter rains. The yields of oats depend so much upon time of seeding, fertilization, and character of season, that results are extremely variable, but satisfactory crops are commonly obtained on well-prepared ground.

Most of this type is well adapted to such crops as cowpeas, velvet beans, sweet potatoes, and peanuts. The favorite locations for sugar-cane patches are the somewhat depressed areas at the heads of local drainage ways. The lighter colored areas produce 300 to 400 gallons of sirup per acre, of a quality superior to that produced on the darker colored areas.

Strawberries are grown commercially on the Ruston fine sandy loam in other counties, but are not produced on the type here. Many gardens in which small truck, Irish potatoes, muskmelons, and watermelons, as well as a great variety of flowers and ornamental plants, are grown, indicate the adaptability of the type to such products.

The type is not so well adapted to grasses and most forage crops as the heavier types. Bermuda grass and lespedeza thrive around homesteads and on abandoned house sites, but seldom make as vigorous growth as on the alluvial bottoms and benches. In abandoned fields these desirable forage plants, as well as carpet grasses, can not compete so well with the broom sedge and pine seedlings as on the clay soils. Where fires are kept down lespedeza and carpet grass have a tendency to spread, competing much more successfully with the less desirable grazing plants.

Sudan grass and sorghum do moderately well, the yields being rather light. It is necessary to apply lime in growing bur, crimson, or other large clovers successfully. Pecans will succeed on the type, as will also figs, pears, dewberries, and blackberries.

At present (1920) the price of improved land near the railroad towns and along the principal roads ranges from $25 to $50 an acre. Unimproved land of this type brings from $10 to $20 an acre.

*Ruston fine sandy loam, rolling phase.*—The topography of the rolling phase of the Ruston fine sandy loam ranges from strongly rolling to somewhat broken. This feature represents the principal distinction from the typical soil, although there is also a consequent greater variation in the depth of the soil on the slopes and over the ridge crests.

The greater part of the phase remote from the large streams occurs on secondary ridges extending from the sides of the main divides. These are bordered by wooded ravines that unite with larger branches, along which the slopes are generally less steep. As a rule rounded ridges, long slopes, and roundish valleys prevail rather than sharp ridges and V-shaped valleys, so that this is not a "broken" or "rough" type of land. The crests of the divides may be occupied in part by Orangeburg fine sandy loam. On the flanks there is more variation in the depth of the surface soil and in the character of the subsoil than in the typical Ruston fine sandy loam. Spots of Susquehanna clay occur on many of the lower slopes.

The areas near the larger creeks include some broken or gullied land, showing considerable range in soil conditions. On the interstream divides there are occasional spots of a few acres of nearly level Orangeburg fine sandy loam, and on the less rugged slopes there are somewhat larger fields of the typical Ruston soil. Coarse gravelly sandy loam occurs only in spots, and ferruginous material in the form of large stones, or flat, or angular fragments, is rarely found.

Some of the stony patches, such as that about 2 miles north of Hyslop Church, represent Lauderdale soil. Most of this consists of Lauderdale fine sandy loam, that is, grayish fine sand overlying whitish stiff brittle clay, derived from a whitish claystone of noncalcareous nature.

The areas in the northern part of the county include much Orangeburg fine sandy loam on the crests of narrow ridges and a complex of Ruston, Susquehanna, and Caddo soils on the slopes. The tillable areas of 10 acres or more are usually strongly rolling lands where Ruston fine sandy loam, with a rather heavy subsoil, is the prevailing type. But the total area of land on which cultivated crops may be economically grown is very small. Abandoned fields and old building sites are numerous. Some well-terraced slopes, which are being safely cultivated, are seen here and there.

Most of the rolling phase is covered with a mixed growth of shortleaf pine, oak, and hickory on the higher ground, with a large admixture of bay, holly, beech, gum, and occasionally ash and poplar, in the branch bottoms. As a rule, most of the merchantable timber has been removed. Practically all this phase is better adapted to forestry than to agriculture.

*Ruston fine sandy loam, mixed phase.*—The mixed phase of the Ruston fine sandy loam consists of Ruston fine sandy loam with many strips of Caddo fine sandy loam or very fine sandy loam along the lower slopes and about the heads of drainage ways. Small areas of this mixed phase are developed a few miles southeast of Trenton. Most of the Ruston soil has a rather heavy subsoil and a decided tendency to pass into the lighter colored and less well drained Caddo soils in all locations where the local relief becomes slight, but on the crests of ridges or wherever the slope is quite pronounced the Ruston fine sandy loam with friable reddish-yellow subsoil generally prevails. Very little of this land is in cultivation, but if brought under the plow the variable soil conditions will become more apparent. Practically all of this phase has sufficient slope to require terracing and is therefore well drained, but the Caddo series will need some artificial drainage.

The areas 5 or 6 miles southwest of Raleigh include a great deal of the Caddo fine sandy loam, which in places merges with the Bibb and some very poorly drained Ochlockonee soils. The Ruston soil of the higher ground is gently rolling, well drained, and for the most part very similar to areas of the type found a few miles farther north, but it includes some Caddo soils, and on the extreme lower slopes these are too poorly drained to be very desirable for cultivated crops.

The small areas drained by Jump and Coon Creeks consist of these mixed soils, rather heavy variations of the Ruston fine sandy loam and various lighter colored and less well drained soils on the lower slopes. There are many small patches of the Caddo fine sandy loam in all the areas drained by these creeks and in the areas between New Liberty School and Strong River. The land now in cultivation consists chiefly of the lighter and better drained variations of the Ruston soil.

*Ruston fine sandy loam, light-textured phase.*—This phase is really a distinct type, the Ruston sand, which has been included as a light textured phase of the Ruston fine sandy loam on account of its small extent.

This soil occurs on many of the higher ridges in the areas of Ruston and Orangeburg soils as spots of loose sand, several feet in depth. The surface is normally a gray medium sand changing at about 3 to 5 inches to pale-yellow loose sand, which passes below into yellow and then into reddish-yellow or, in some instances, red sand. Below 3 feet this rests upon materials similar to the substratum of the heavier types, such as the Orangeburg sandy loam. This sand seems to include few minerals other than quartz. Some included areas consist of fine sand, and some which do not have the reddish color in the lower subsoil represent included Norfolk sand or fine sand.

Only a few of these sand knolls have an extent of more than 2 or 3 acres. Some of the larger areas are shown on the map. They are of

low natural agricultural value, and are usually covered with black-jack oak, with a scattering of large pines. With fertilization this soil has been successfully used in various parts of the South for peaches, sweet potatoes, watermelons, and a variety of early vegetables. In seasons of good rainfall cotton and corn give fair yields when properly fertilized.

### ORANGEBURG FINE SANDY LOAM.

The surface soil of the Orangeburg fine sandy loam is a brownish-gray to light-brown friable fine sandy loam, changing at depth of a few inches to reddish-brown or reddish-yellow fine sandy loam, which continues to a depth of about 10 or 12 inches. The subsoil is a brick-red friable fine sandy clay, extending with little change to depths ranging from 24 to 30 inches, below which the color is locally less reddish and the texture more sandy. In some places the brick-red sandy clay extends below the 3-foot section, but as a rule the lower subsoil is a friable sandy loam which in many places is more compact than the upper subsoil. The substratum gradually changes with depth to sand or loamy sand, and at a depth of 10 or 12 feet is loose sand, so slightly oxidized as to be gray or nearly white.

The lightest variations of the type are usually on knolls. Slopes of moderate inclination have lost much of the original surface soil, so that the soil has a distinctly brown color. In some shallow depressions the surface soil is a dark brownish red loam and the subsoil is heavier than the average. Some quartz gravel and small concretions are found, but rarely any large concretions and no stones.

The soil and subsoil are distinctly acid, and no evidence of free lime is found in the underlying sands. The originally scant accumulation of humus has long since disappeared from most cultivated soils, except in occasional local depressions where its presence is apparent in the darker surface color.

This type occurs in considerable areas, mainly in the southern half of the county. It is generally developed on the broad interstream divides, where the gently rolling topography favors its full utilization for farm crops.

The Orangeburg fine sandy loam is highly esteemed throughout the South. The adaptability of this soil to agriculture is due chiefly to its excellent physical structure. The surface soil is easy to till. The subsoil, or brick-red zone, is composed of sand, clay, and iron oxides in such proportions as to absorb moisture readily, and to retain it well, but not to the point of saturation. Capillarity from this moisture reservoir is excellent. Plants are supplied with moisture more uniformly than on soils of coarse texture or those so high in clay as to be exceedingly retentive. There is little loss of applied fertilizer by leaching, and moisture conditions make it readily available to the growing plant. All cultivated crops endure seasonal extremes remarkably well.

Areas south and southwest of Mize are representative of the type, and include but little ground too rolling or otherwise unsuitable for economical tillage. The areas to the north and northeast and along the Mize-Raleigh road lie on the interstream divides, which break off rather irregularly at the heads of short tributaries of the creeks,

consequently the areas here are smaller in extent and more irregular in outline.

The type is well developed around Bezer, but toward Raleigh it merges into some heavy variations of the Ruston fine sandy loam. The small areas throughout the north-central and northwestern part of the county range from level table-land of Orangeburg loam to somewhat rolling lands of coarser texture. As mapped, but little of the rolling phase is included in these small areas.

The type responds well to fertilization. Corn generally yields from 20 to 40 bushels per acre, with the use of only a few tons of stable manure per acre. A little acid phosphate is used by some farmers on corn ground, but usually the residue from a crop of peas or velvet beans is the only fertilizer applied. Lighter applications of manure, with 200 or 300 pounds of acid phosphate, are generally sufficient for good results with cotton—yields of one-half to one bale per acre—provided the boll weevil is not troublesome. Nitrogenous fertilizers will give markedly increased yields, but as the soil is adapted to the soil-improving nitrogen-supplying crops, the content of nitrogen in the fertilizers can be reduced to a minimum by growing the legumes, particularly velvet beans and cowpeas, in rotation with the other crops.

Nearly all the other crops commonly grown do well on this type. Lespedeza appears to make somewhat less vigorous growth than on the bottom lands. The yield of sugar cane is heavy, with some fertilization, but the sirup is said to be darker and less desirable for marketing than that from lighter-colored soils. Bermuda grass and carpet grass thrive, particularly on the heavier variations or where the surface soil is shallow, provided fires are kept down. This type is considered very desirable for peaches and pears. Pecans, figs, dewberries, and blackberries also succeed on this soil.

At present (1920) the value of much of this type is around $40 or $50 an acre, the price varying with the improvements and other factors, such as the character of other soils on the farms, the topography, and roads. Well-improved farms near towns command a higher price, although changes in ownership of such farms are not frequent. Isolated areas of small extent, not well located with respect to roads, sell for $15 to $25 an acre.

Some areas of Orangeburg sandy loam have been included with the Orangeburg fine sandy loam. The chief differences are the coarser texture and somewhat more variable depth of the surface soil in the sandy loam type. The areas 8 to 10 miles northeast of Taylorsville are undulating to gently rolling uplands, practically all of which are in cultivation. Some of these lands have been continuously cropped with less attention to terracing and the incorporation of crop residues than should have been given to such valuable farm lands. On farms that have received good care the average crop returns are the same as on the fine sandy loam. Most of this land is valued below that of the finer textured Orangeburg soils, but this is due chiefly to the difference in location.

Some areas representing a light-subsoil phase of the Orangeburg sandy loam are included with the Orangeburg fine sandy loam. These areas consist of a very friable sandy loam, which grades at a

depth of 3 or 4 feet into loose loamy sand, ranging in color from light yellowish red to brownish yellow. At somewhat greater depth, loose, light-colored, unoxidized sand may occur.

The surface soil of this phase is generally lighter in color and more sandy than that of the typical Orangeburg sandy loam. In cultivated fields bleached surface sand is a more pronounced feature than on any of the sandy loams having a clayey subsoil. This soil is rather droughty in dry seasons, and there is also considerable loss of fertilizer through leaching. Organic matter oxidizes more rapidly than on soils that retain moisture better and do not become so warm as this soil.

Several small areas lie near Shady Grove Church, and many spots are included in the Orangeburg sandy loam.

The rather low esteem in which this variation is held locally is due in part to the characteristics mentioned, but in part also to careless methods of tillage. With more careful terracing, and a liberal return of organic matter this phase is well adapted to cotton, cowpeas, velvet beans, and most of the minor crops.

*Orangeburg fine sandy loam, rolling phase.*—The rolling phase of the Orangeburg fine sandy loam differs from the typical soil in the rougher topography and in the greater variation in the depth of the soil. Much of it occupies the slopes of divides that have the typical soil on their crests. In places the surface is broken, with a range in local relief of about 100 feet. Small areas not too rolling for cultivation occur in nearly all the larger tracts.

Much of this phase is still in forest, consisting of longleaf and shortleaf pine, many kinds of oak, hickory, and some ash, poplar, holly, and other trees. The rather small areas in cultivation require careful tillage and the maintenance of terraces to prevent serious injury by heavy rains. Old gullied fields or small eroded patches on the flanks of divides are rather common features in many places.

While very satisfactory crop yields are often obtained, the labor cost is high, owing to the impracticablity of using 2-horse implements and the expense of maintaining terraces. Much of this phase should remain forested.

Some areas of a rolling phase of the Orangeburg sandy loam, having nearly the same features as the rolling phase of the Orangeburg fine sandy loam, except that of coarse texture, have been included with the rolling phase of the Orangeburg fine sandy loam. Here the soil averages coarser in texture, and in many places passes into the deep loamy sands that give rise to very friable and easily eroded soils. In the areas adjoining the sandy loam the relief ranges from about 100 to 120 feet, and the hillsides are so steep as to be practically untillable. Small patches of excellent soil occur on the crests of divides, and desirable areas occur in many of the draws or wider branch bottoms, but such areas for the most part contain only a few acres. Some small farms consist chiefly of this phase, but most of it is uncleared.

### SUSQUEHANNA FINE SANDY LOAM.

The Susquehanna fine sandy loam in forested areas consists of a gray to slightly dark gray fine sandy loam, which passes at about 1 to 2 or 3 inches into pale-yellow or yellowish-gray fine sand and

this at about 6 to 10 or 12 inches into red or yellowish-red, heavy, plastic clay, sticky when wet. The lower subsoil is invariably mottled with various shades of red, yellow, and gray, gray or bluish gray becoming the dominant color at 3 or 4 feet below the suface, although some red and yellow color is usually present even at depths of 3 feet. Generally the substratum is a light-gray or very light bluish gray clay, having a somewhat blocky or jointed structure, especially at its contact with the overlying subsoil. In places the subsoil begins as a mottled clay, and in such places the red mottling sometimes disappears completely within the 3-foot section, giving way to gray and yellow.

The partly weathered material is more or less pervious, but the unaltered clay below is almost impervious. Most of the underdrainage is accomplished by a lateral movement, particularly on the steeper slopes.

The loose structure of the immediate surface layer is due to the admixture of humus, but there is practically no organic matter in the subsoil. On drying the stiff red clay develops a granular structure, but when wet it is very adhesive. The underlying grayish mottled clay is extremely hard when dry.

The type is associated with the Ruston fine sandy loam, and usually in most places occurs on gentle slopes and low divides near drainage lines. Only the larger areas are indicated on the map. Innumerable patches varying in extent from a fraction of an acre to several acres occur in practically all the smoother areas of the Ruston soils. Spots of the Susquehanna soil occur in areas of the Orangeburg fine sandy loam, rolling phase, but these are usually little more than patches of fine sandy loam, with a stiff intractable red clay as the subsoil.

Longleaf pine and scrub oak are the characteristic trees, with sedge grass as the principal undergrowth on the cut-over land. In sags and seepy spots water-loving grasses, including species of paspalum, generally form most of the cover.

Little of this type is in cultivation. It is difficult to manage in a wet season, but in favorable years—rather dry, with well-distributed rainfall—good yields of cotton are obtained. It is better adapted to such grasses and forage crops as are generally grown on upland soils. The rougher areas undoubtedly could be most profitably used for a combination of forestry and grazing. Pine does well, and, if protected from fires, would yield a fairly good annual increment in cordwood, pulp wood, or saw timber. The returns, of course, would be deferred 20, 30, 40, or 50 years, according to the use to be made of the forest, except for pasturage returns and the turpentine and resin that could be harvested from slash and longleaf pine after the trees have attained sufficient size for cupping.[5]

### SUSQUEHANNA CLAY.

The immediate surface soil of the Susquehanna clay is variable in color and texture, ranging from light-gray very fine sandy loam to brownish or reddish-brown sandy clay loam, sandy clay, or clay. At a depth which seldom exceeds 4 or 5 inches, red or yellowish-red,

[5] See Farmers' Bulletin No. 1256, Slash Pine.

plastic heavy clay occurs, which grades downward into mottled reddish-yellow, red, and yellow, and often gray, very plastic or sticky heavy clay, and this into mottled bluish-gray, yellowish, and often reddish clay of the same texture and structure. In some places the lower part of the 3-foot section is a yellowish clay, with very little mottling, which is even more adhesive when wet than the overlying red clay. In places the clay is mottled near the surface. On slightly eroded hillsides this clay forms a stiff soil difficult to keep in good tilth. It is very sticky when wet, and hard when dry.

Small patches of this clay, with a thin surface layer of very fine sandy loam or silty loam, are of frequent occurrence in the areas of Ruston fine sandy loam mapped throughout the southern part of the county. Somewhat larger areas, but too small to map, are associated with the Kirvin soils, particularly in the areas northwest of Raleigh.

The large area in the northeastern part of the county is rather low, with a generally undulating surface, and gradually changes on the east to the typical Montrose clay. The area east of Clear Springs Church is rolling to somewhat hilly. The surface soil here is sandy in many places, but a heavy clay subsoil prevails. On the north the area grades into the Houston clay.

Except along the line of contact with the Houston clay, all the Susquehanna clay is very deficient in lime. This is particularly true of all the type in the southern part of the county and the small areas included in the Ruston fine sandy loam. In areas associated with the Kirvin, Oktibbeha, and Montrose soils, the material is very acid to litmus, but evidence of some influence by lime would seem to be apparent in the brownish-red color and harsh granular structure the clay assumes on drying, compared with the clay of typical Susquehanna soils.

Comparatively little of this type is cultivated. It is too heavy to be conveniently tilled with the light equipment which serves well on sandy soils. Many fields have been thrown out of cultivation, and abandoned house sites are numerous. In these old clearings the pasturage is better than that in corresponding locations on sandy soils. This soil, in the main, is best suited to forestry and grazing.

### RUSTON AND ORANGEBURG FINE SANDY LOAM, UNDIFFERENTIATED.

The areas mapped as Ruston and Orangeburg fine sandy loam, undifferentiated, comprises land so rough as to be nonagricultural, composed mainly of Ruston and Orangeburg soils in close association, but including patches of various types.

The areas east of Raleigh are hilly to broken and contain many outcrops of gray sandstone. The relief ranges from about 150 to 200 feet, and the most abrupt slopes generally face the north. On the top of the highest ridges the Orangeburg sandy loam usually occurs in narrow irregularly shaped areas seldom exceeding a few rods in width. The partly oxidized substratum of sand shows in the extreme heads of many ravines. Just below this sand the gray rock is generally exposed and in many places forms the crest of broken, uneven divides, on whose flanks the soil more generally corresponds to the Ruston fine sandy loam. Stony patches, seepy spots, and occasional patches of sand several feet deep are of common occur-

rence. Innumerable local drainage ways further complicate the soil conditions, but there is little alluvial soil except on the larger branches.

The areas 4 to 5 miles south of Sylvarena consist chiefly of high narrow ridges, from 100 to 150 feet above the streams. There is but little rock outcrop here, but iron concretions are abundant in many places. Sands and sandy loams of the Orangeburg series predominate on the crests of these ridges, while farther down the slopes mixed materials, similar to the Ruston soils, commonly prevail.

The region covered by these soils has recently been logged off. Small acreages of tillable land are found, but the region as a whole is unsuitable for cultivation. The present pasturage value is low. Water is abundant, as there are many springs and the larger branches are perennial. All this land is better suited to forestry than to any other use.

### RUSTON AND SUSQUEHANNA FINE SANDY LOAM, UNDIFFERENTIATED.

In the northeastern part of the county there is a considerable area mapped as Ruston and Susquehanna fine sandy loam, undifferentiated, which is composed of Ruston and Susquehanna soils so intimately associated that separation on a map of the scale used is impracticable. This region, lying chiefly on the headwaters of Ichusa Creek, is thoroughly dissected by small branches, but the relief is mild. The differences in local elevations rarely exceed 40 or 50 feet, although the main divides rise to perhaps 80 or 100 feet above the larger streams. Excepting occasional short slopes along the creeks and small areas more or less cut by ravine-like heads of drainage ways, practically all this land is tillable. Nearly all is now in virgin pine forests, with few roads other than trails made by the wagons of turpentine gatherers. The few farms established are mostly on the lighter variations of the Ruston fine sandy loam.

Throughout this area the predominant soil on the higher ground is the Ruston fine sandy loam. The sandy surface soil varies considerably in depth, but usually the brownish-red or yellowish-red friable sandy clay subsoil is reached at less than 10 inches from the surface. On the higher knolls some concretionary material may be present, but elsewhere there is little stony material of any kind.

On nearly all slopes the Susquehanna fine sandy loam is the prevailing type. This may be distinguished from the Ruston by the lighter gray tint of the subsurface layer of fine sandy loam, and the red, sticky, clay subsoil. On the lower slopes, where the surface is more nearly level, soils with light-gray subsurface layers and mottled poorly drained clay or silty clay subsoils very generally occur. These resemble types of the Myatt and Caddo series.

In all instances the immediate surface layer consists of 2 to 3 inches of very dark fine sandy loam, rich in organic matter.

In general the basic material from which all these soils are derived is a clay, with some fine sand and occasional sandy layers. There are no indications of lime, as in the Montrose clay to the north, and few places where the dark brownish red clays occur, as in the Kirvin areas to the south. If brought into cultivation, the soils of the higher ground will be found very similar in crop adaptation to the heavier variations of the Ruston fine sandy loam, and the slope lands

will more generally correspond to the Suequehanna fine sandy loam. The Caddo and Myatt fine sandy loams bordering the drainage ways are cold, seepy ground, unsuitable for tillage unless drained. The branch-bottom soils in this group are mostly Bibb silt loam and fine sandy loam.

The present high valuation of this mixed land is due to the fine stand of longleaf pine. Where this has been largely removed, the valuation ranges from $5 to $15 an acre.

ORANGEBURG AND SUSQUEHANNA FINE SANDY LOAM, UNDIFFERENTIATED.

The land in the northern part of the county, drained by Tishkill, Teock, and Bowlen Creeks, and mapped as Orangeburg and Susquehanna fine sandy loam, undifferentiated, is a hilly region, and the greater part of it is practically nonagricultural. The prevailing configuration is a series of narrow ridges, separated by small creeks and branches, the extreme heads of which are usualy ravines with sandy slopes. A mile or two from the heads of the creeks the adjacent hillsides in many instances are not so steep, and tillable areas of a few acres are of common occurrence. Many of these include some branch bottoms. Broadly considered, the strong relief, ranging from 100 to 150 feet, limits tillage to the locations just mentioned, and to occasional patches of a few acres on the higher ridges.

The region is thinly settled. The few public roads wind along the crests of the main divides, and the secondary roads are trails through the woods. With the exception of the occasional farms, these lands are covered with a mixed forest of shortleaf pine and hardwoods.

On the crests of the divides the Orangeburg fine sandy loam is the prevailing type, and it generally extends a short distance down the slope. The Ruston fine sandy loam occurs in places, particularly on the secondary divides and slopes of moderate inclination, but lying well above the level of the drainage ways. On the lower slopes a shallow fine sandy loam over clay subsoil is the prevailing profile. Variations of each of these types, and differences in depth of soil and character of subsoil, are of course common in all localities.

In the region drained by Bowlen Creek the Orangeburg soils include some small patches of very red sandy land, much like the Greenville loam, and associated with these are low ridges and some slopes where the Kirvin clay is recognizable. Most of the heavy soil is Oktibbeha clay, with a variable although generally shallow covering of sandy loam. All these are excellent soils with respect to inherent fertility, but patchy in occurrence, and with a topography not well suited to tillage. Toward Leaf River the relief is less rugged, and more of the land is Ruston fine sandy loam.

In the section tributary to Tishkill Creek the Orangeburg fine sandy loam of the hilltops soon gives place to deeper sandy soils on the upper slopes with variable subsoil conditions. On the lower slopes the Susquehanna fine sandy loam generally prevails, although in local elevations the sticky clay subsoil of this type grades to a much more friable sandy clay, resembling the Ruston subsoil.

On the tops of the ridges immediately south of Talla Bogue there is a great deal of Orangeburg sand and sandy loam, but the flanks and lower slopes are occupied by Susquehanna soils, which at the lower margin grade into the long gentle inclines of the Houston clay.

Nearly all this region of mixed Orangeburg and Susquehanna soils is owned by lumber companies. It affords a wide area of free pasturage, but the grazing is not of good quality, except in abandoned fields of the clay soils. Springs are numerous and the branches are perennial.

Practically all this land is much better adapted to forestry than to other uses. The original character of the forest is obscured to some extent by removal of much of the marketable timber, but the hickory, white oak, ash, and poplar show a decided preference for the Oktibbeha and Susquehanna soils, while the pine seems to prefer the areas where Orangeburg and Ruston types prevail.

### GREENVILLE LOAM.

The Greenville loam is a highly desirable agricultural type, characterized by the dark-red or brownish-red color which prevails from the surface to a depth of several yards. The surface soil ranges from a red sandy loam to a very dark brownish red moderately heavy loam. The subsoil is generally a rich-red or dark brownish red friable sandy clay. In places it contains moderate quantities of dark-brown concretionary material. The structure to a depth of several feet is favorable to the maintenance of excellent moisture conditions, and the underdrainage is good, but not excessive, consequently the type endures extremes of wet and dry weather remarkably well. Aeration is very deep, as shown by the uniform oxidation prevailing to an unusual depth.

The type occupies less than 1 square mile. It occurs in small areas on the tops of rather flat tablelike divides, and in occasional slight depressions within larger areas of Orangeburg soils. Small typical areas are mapped near Sylvarena. Those farther north in the vicinity of Hopewell Church are associated with the Kirvin fine sandy loam, which prevails on the slopes and rougher lands, while the Greenville loam occupies the rounded crests and gentler upper slopes of divides. Some areas grade into and resemble the more reddish variation of the Orangeburg fine sandy loam.

This type is well adapted to the general farm crops of the region. While terraces are necessary on some of the more sloping areas, improved farm machinery may be used in all cultural operations.

Practically all the Greenville loam is or has been in cultivation. The productiveness of the land is said to have decreased to some extent, but with moderate fertilization good crops are obtained. The type responds well to barnyard manure and to phosphatic and nitrogenous fertilizers. Corn, cotton, and oats give as high average yields as on the best Orangeburg soils, and the quality is good. Sweet potatoes, peanuts, cowpeas, and velvet beans are very successfully grown. The soil seems to be well adapted to peaches and pecans. Near Sylvarena the small areas are considered the choice land of the farms in which they occur. The areas farther north are not so well located with respect to roads.

### OKTIBBEHA CLAY.

The Okitibbeha clay in the vicinity of Trenton is a brownish-red heavy clay which passes downward through a brick-red heavy clay into lighter red or reddish-yellow very heavy sticky clay faintly

mottled with yellow or greenish yellow. In places, commonly where the underlying limestone comes within 3 or 4 feet of the surface, the lower subsoil is greenish yellow and contains some whitish fragments of disintegrated limestone. Fragments of limestone are abundant on the surface here and there, and ledges outcrop on the steep slopes facing Strong River. There are some included patches of Sumter clay and Sumter loam (brownish soils with a greenish-yellow subsoil, locally containing whitish fragments of limestone) and spots of Houston clay (a black to ashy-brown clay underlain by calcareous clay). Eastward the Oktibbeha clay merges into the Susquehanna and Kirvin soils.

The Oktibbeha clay on the east side of Leaf River and Ichusa Creek near Sylvarena includes numerous steep slopes and some sharp bluffs with abundant outcrops of limestone. On the higher ground there are some tillable patches in which the sticky red clay is modified by sandy material from the adjacent Ruston soils. There are also included some spots of Sumter and Houston clay, and on the lowest slopes and in the embayments of the river valley there are patches of Trinity and Catalpa soils. This mixture of soils, derived from outcrops of limestone overlain by noncalcareous sands and clays, is too complex to be separated on a map of the scale used. The prevailing conditions only are represented.

The small areas along West Tallahala Creek are generally too rough and stony for agricultural use.

Formerly much of this type, particularly near Trenton, was in cultivation but it has generally been allowed to revert to pasture, partly on account of the difficulty of keeping it in good tilth. Heavier equipment is needed than the size of the cultivated fields usually warrants. Shortleaf pine now occupies much of the type. The open fields are mostly the more calcareous variations, where the native grasses thrive exceptionally well. In general all this type is better adapted to stock raising than any other purpose. Alfalfa could be grown on the included patches of calcareous soil—the Sumter and Houston, or the brown and black areas. The present average valuation is about $10 an acre.

### KIRVIN FINE SANDY LOAM.

The Kirvin fine sandy loam is a somewhat variable type, but most of it is a gray or brownish-gray very friable fine sandy loam, 5 to 8 inches deep, overlying brownish-red to brick-red stiff clay or slightly sandy clay. The subsoil proper is a slightly sandy clay to heavy clay mottled with reddish yellow, limonite yellow, and brownish red. The lower subsoil is generally compact, but it is not impervious and fragments of the clay crush into friable material when fairly dry. Iron concretions are present in the soil and subsoil, and in many places are very abundant. The subsoil mottling, as revealed in road cuts, consists of red, brown, and yellow iron stains that prevail locally to a depth of several feet.

Here and there the lower subsoil grades downward into light-colored heavy clay. In many places on the higher divides the upper subsoil resembles the subsurface material of the Orangeburg and

Ruston types, and some small areas of these soils have been included. Toward the northern limits of this type there is a tendency toward a less marked distinction between it and the Orangeburg fine sandy loam.

The Kirvin fine sandy loam is of common occurrence between Sylvarena and Ted. The surface is rolling to hilly, and there are some included areas which are too rough for cultivation. Near Sylvarena included areas consist of a clay loam, the presence of which is due largely to erosion since the fine sandy loam has been brought into tillage. This soil represents an advanced stage in the weathering of Susquehanna material as a result of better drainage. The subsoil is stiffer than that of the Orangeburg, but on the average is more friable than the subsoil of the Susquehanna types.

Most of this type has a crop adaptation similar to the Orangeburg soils, but tillage is more difficult on account of the rougher surface. Much of this soil near Warren Hill Church was in cultivation before the Civil War and still produces fair crops. Owing to the uneven topography the soil conditions are more variable within small areas than in the Orangeburg or Ruston types.

The present price ranges from about $20 an acre for the more desirably situated lands to as low as $5 an acre for rough lands distant from good roads.

The areas now in cultivation and those practically abandoned can be improved by better terracing and by plowing under legumes to increase the supply of organic matter. Under such management the less hilly areas have a crop value approaching that of the most desirable red lands.

*Kirvin fine sandy loam, stony phase.*—The stony phase of the Kirvin fine sandy loam is characterized by an abundance of red, reddish-yellow, and yellow, large and small fragments of hard concretionary rock material on the surface. These are highly ferruginous and range in size from pebbles to irregular masses a foot or more in diameter. In places there is much thin, hard, "platy" material, and some quartz gravel.

The soil is generally a shallow fine sandy loam overlying a stiff clay, which is conspicuously mottled in places.

One small area occurs on the top of a high ridge in the west-central part of the county, and patches of an acre or less occur in this locality. It is not suitable for cultivation, but is valuable for the production of pine timber.

The following table gives the results of mechanical analyses of samples of the soil, subsurface, and subsoil of the Kirvin fine sandy loam:

*Mechanical analyses of Kirvin fine sandy loam.*

| Number. | Description. | Fine gravel. | Coarse sand. | Medium sand. | Fine sand. | Very fine sand. | Silt. | Clay. |
|---|---|---|---|---|---|---|---|---|
| | | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* |
| 424547..... | Soil, 0 to 8 inches.. | 1.3 | 6.3 | 6.4 | 32.7 | 18.6 | 27.7 | 6.9 |
| 424548..... | Subsurface, 8 to 24 inches. | 1.2 | 3.9 | 2.3 | 15.8 | 11.1 | 34.6 | 31.1 |
| 424549..... | Subsoil, 24 to 36 inches. | .3 | 3.0 | 3.2 | 13.1 | 10.9 | 33.1 | 36.4 |

### KIRVIN CLAY LOAM.

The Kirvin clay loam differs from the Kirvin fine sandy loam chiefly in the heavier character of the surface soil, which, however, is variable in texture. Much of the type is a rather heavy reddish-brown loam or sandy clay loam to clay loam, overlying at shallow depths deep-red heavy clay to slightly sandy clay, which usually becomes lighter red in the lower subsoil and contains some limonite-yellow, friable material. This is particularly true of the type near Trenton and southward along its contact with the Oktibbeha clay. North and east of Trenton more of the type is a fine sandy loam, varying a great deal, even in small fields, in depth and in the relative proportions of sand and clay. Small iron concretions are present nearly everywhere, and in many knolls are so abundant as to almost cover the surface. These spots are often termed "pebbly land." All of these sandy variations are easily tilled, but are inclined to wash badly. On most of the steeper slopes the reddish-brown clay is more or less exposed, giving rise to areas considerably heavier than the sandy loam. With the exception of the badly eroded hillsides, all this soil has enough sand and coarse ferruginous material to render it rather friable and to give the immediate surface a physical character resembling that of a sandy loam. There are many spots of stiff intractable red clay in all old fields.

The subsurface clay has a more or less granular structure. This property, with the included sand and concretionary material, increases its permeability and favors a relatively free moisture movement and deep aeration. The exceptions are noticeable where the gray joint clay, or "chalk," may be exposed in a shallow hillside ditch, usually in a patch of ground that is alternately too wet or too dry for satisfactory cultivation.

In general the subsoil is stiffer than that of either the Orangeburg or Ruston fine sandy loams, but it is not so stiff as that of the Susquehanna. The soil resembles the Susquehanna at first glance, but examination shows a somewhat more friable subsoil, and the color of the subsoil, in the upper part especially, is typically a brownish-red color as against the dull-red, or yellowish-red, or mottled color of the Susquehanna. And further, the Kirvin is very noticeably more productive than the Susquehanna.

Most of this type ranges from strongly rolling to hilly. Small areas are too rough for tillage and are in forest. A great variety of hardwood species and much shortleaf pine is found, but no longleaf pine. Abandoned fields are covered with broom sedge. Among the smaller plants are many of the more valuable grasses, but they do not flourish as on the soils more closely associated with limestone. All of the Kirvin material is distinctly acid.

All crops commonly grown in this locality are successfully raised on this type. It requires rather careful handling to prevent washing and, on the heavier variations, to avoid a compact or cloddy condition. The type responds very well to fertilization, and the yields of cotton and corn are largely determined by the amount of fertilizer applied. Acid phosphate gives good results. Velvet beans and cow-

peas do well and offer the most practicable means of adding nitrogen. Potash does not seem to be as necessary as on the more sandy types. The quality of crops is good.

The present (1920) price of land of this type ranges from $5 or $10 an acre to about $15 or $20.

### CADDO FINE SANDY LOAM.

The Caddo fine sandy loam in cultivated fields is a very light brownish gray or yellowish-gray fine sandy loam, loose when dry and inclined to pack when wet, underlain at 3 to 5 or 6 inches by pale-yellow heavier fine sandy loam, and this, in turn, at depths ranging from 8 to 12 inches, by yellow or pale-yellow moderately friable fine sandy clay, mottled below 18 to 30 inches with gray and some reddish yellow or yellowish red. The lower part of the 3-foot section is usually compact, especially when relatively dry, and this lower stratum locally contains dark-colored brownish and yellowish concretions and concretionary material not yet developed into the pebble shape. In places the lower subsoil consists of a rather stiff clay, mottled yellowish and bluish gray, with some red here and there. This clay resembles the Susquehanna subsoil, but it is usually more sandy. Light yellow with gray mottlings are the dominant colors of the substratum, the proportion of gray increasing with depth.

In most places there is considerable small, well-rounded quartz gravel on the surface, as well as some brown iron concretions, ranging from size of peas to small marbles. In many places most of the sand is of the finer grades, so that the texture is finer than that of fine sandy loam. Some included areas range to a very fine sandy loam.

About 1 mile north of Hyslop Church there is a patch of Plummer silt loam not outlined on the map, which consists of gray silt loam to loam (black for an inch or so in places), which passes abruptly into light-gray or bluish-gray silty clay loam mottled with pale yellow, and this into light-gray or bluish-gray clay slightly mottled with pale yellow and containing dark-colored concretions and concretionary material. In places this lower subsoil has the compactness and other characteristics of a hardpan.

The Caddo fine sandy loam is low in organic matter and all of it is very acid, according to the litmus test.

Low ridges, knolls of slight local elevation, and long slopes are the characteristic topographic forms occupied by this soil. On the higher ground, where the drainage is best, the surface soil is light brown and the subsurface tends toward yellowish and reddish-brown coloration. In such locations the compacted substratum lies deeper and is not so well developed as on lower ground or on long gentle slopes. This better-drained variation represents an approach toward the characteristics of the Bowie soils. In the lower situations the underdrainage is so slow that in wet seasons the subsoil becomes saturated and fields are miry. The very noticeable lack of coherence or of a crumbly structure in the lighter colored subsoil variations is probably due to these frequent periods of saturation.

The Caddo fine sandy loam is characteristically developed on the gently rolling lands around Pineville. Where the relief becomes

more pronounced the type grades into the Ruston fine sandy loam. The areas a few miles north of Pineville are associated with the Susquehanna clay and Montrose fine sandy loam, and include variations of these types.

This soil is too cold and late to be well adapted to cotton under boll-weevil conditions. Corn, oats, and most other crops make satisfactory returns in seasons of slight rainfall. During rainy periods tillage is unsatisfactory and often much delayed. It is probable that soil of this type on farms including other better drained types could best be used for farm woodlots and for pasture.

### MONTROSE FINE SANDY LOAM.

The Montrose fine sandy loam generally consists of 5 or 6 inches of light-gray loose fine sandy loam, rather low in organic matter, underlain by a yellowish, stiffer, heavier fine sandy loam, which passes into a yellow or pale-yellow subsoil of sticky clay, in places containing some fine sand. On slopes where the drainage is fairly good the subsoil may be yellow with more or less reddish-yellow mottling, but on flats and at the base of gentle slopes it is usually a pale-yellow sticky sandy clay with but little mottling. The subsoil is stiffer than that of the Caddo soils. Included with this type are some areas of Montrose very fine sandy loam.

The areas of this type mapped in the extreme northeastern corner of the county consist of low ridges and gently rolling slopes along streams, where the Montrose clay gives place to more sandy material. The soil in such locations is somewhat variable.

West of Leaf River the areas are mostly long, low divides between small streams. On the slopes the soil is similar to that described above, but where the surface is nearly level the texture ranges from fine sandy loam to very fine sandy loam, with a silty clay or a fine sandy clay subsoil, in which the very light color and pale-yellowish stains indicate extremely poor underdrainage. A somewhat compact layer occurs locally at 24 to 30 inches from the surface, such areas approaching the characteristics of the Caddo soils. In the virgin or timbered areas there is an inch or two of partly decomposed forest débris on the surface.

The predominating large timber is shortleaf pine and post oak. There is generally a rather thick growth of oak saplings with some young pine. The pasturage is poor.

The cultivated ground is confined to low ridges where the more sandy variations of the type occur. In general these locations are hardly safe for cotton under boll-weevil conditions, and the flat areas would be unsuited for this crop, even if artificial drainage were provided. The type produces a good quality of cane and sorghum for sirup. Oats do fairly well on the higher ground, but corn makes very poor growth.

The adaptation of this soil to forage crops and grasses depends very much upon local drainage. Cowpeas and bunch velvet beans afford the best means of improving the tillable areas. All the fall growth of weeds should be plowed under and the ground left rough during the winter to favor drainage. If lime is available from local sources, applications of a few tons per acre would be beneficial to

legumes and assist in preparing the ground for other crops. The advisability of clearing additional areas of this type seems very doubtful. The land probably could best be used for forestry and grazing.

The following table gives the results of mechanical analyses of samples of the soil, subsurface, and subsoil of the Montrose fine sandy loam:

*Mechanical analyses of Montrose fine sandy loam.*

| Number. | Description. | Fine gravel. | Coarse sand. | Medium sand. | Fine sand. | Very fine sand. | Silt. | Clay. |
|---|---|---|---|---|---|---|---|---|
| | | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* |
| 424570..... | Soil, 0 to 2 inches.. | 2.9 | 10.2 | 10.4 | 29.0 | 17.4 | 24.5 | 5.6 |
| 424571..... | Subsurface, 2 to 6 inches. | 2.1 | 9.6 | 9.1 | 27.2 | 16.5 | 27.4 | 8.1 |
| 424572..... | Subsoil, 6 to 24 inches. | 2.1 | 8.8 | 7.6 | 20.9 | 15.3 | 27.8 | 17.4 |
| 424573..... | Subsoil, 24 to 36 inches. | 1.3 | 7.6 | 6.9 | 18.8 | 13.7 | 27.1 | 24.7 |

MONTROSE CLAY.

In its typical development the Montrose clay consists of a surface layer of rather dark brown to yellowish-brown clay, containing enough organic matter to impart a somewhat crumbly structure, underlain at 2 or 3 inches by a sticky heavy clay of a dull-yellow or yellowish-brown color; this passes beneath into light-gray or pale-yellow, heavy clay of an exceedingly sticky nature. The lower subsoil and substratum have a distinctly greasy feel when rubbed between the fingers, and are sticky and impervious. In some places the lower subsoil is conspicuously mottled with shades of red and yellow. At depths of 6 to 8 feet marly clay or soft impure limestone commonly appears.

The soil and subsoil are distinctly acid according to the litmus paper test. Calcareous material is seldom found within 40 inches of the surface. There is also a noticeable lack of even the finest grit in this clay where typically developed.

The Montrose clay is locally called "hog wallow" land, and "post oak flats." As mapped it includes occasional low ridges of Montrose sandy loam and some small spots where the dark surface soil resembles the Houston clay. The soil in the small branch bottoms is usually a dark sticky clay underlain by sticky, poorly drained drab clay, similar to the Bibb clay along the larger streams.

The topography ranges from flat to undulating. The drainage is poor, owing to the topography, the retentive character of the soil, and the impervious nature of the substratum.

At the time of the settlement of the county these lands had a scattering growth of post oak and pine, with more or less of wild crab, plum, and haw trees. The grassy growth of the open places afforded good grazing.

Practically none of this type is in cultivation, and a rather dense forest growth now covers nearly all of it. The larger trees are chiefly post oak and shortleaf pine, the latter ranging from large poles to small saw logs. The smaller growth, often very thick, consists of oak saplings. A noticeable feature of these woods is the

great number of tall pines and thick bodied post oaks tilted at various angles from the perpendicular. At one side the earth is heaved up by the dislocated roots and on the other may be somewhat depressed. Trees completely overturned show the roots to be rather closely bunched and to have penetrated straight downward several feet. The clay usually adheres to the roots in a mass sometimes a cubic yard or more, and leaves a corresponding depression where the tree stood. This may be the origin of the innumerable small mounds and depressions, or "hog wallows," which characterize the type.

Under present conditions this type seems better adapted to forestry than to any other purpose. If the forests were removed grasses that afford good pasturage might be established upon this soil, but this under present economic conditions is not practicable. Only the more sandy areas can be cultivated, as it is practicably impossible to cultivate the clay.

The price of this land is determined almost entirely by the character of the timber.

### HOUSTON CLAY.

The immediate surface soil of the Houston clay is a black clay, crumbly when dry and very soft and sticky when wet. At a depth of a few inches it changes to yellowish-brown sticky clay, and the lower part of the 3-foot section is generally a pale-yellow or greenish-yellow clay, exceedingly tenacious, and with a greasy feel. This lower subsoil material is highly calcareous, and fossil shells and lime concretions are abundant in places. Deep gullies usually expose a light-gray or drab clay of more or less jointed structure, which at slightly greater depth passes into marly clay.

On slopes near the Ruston soils the type grades into the Susquehanna clay, areas of which are numerous east of the Leaf River and along Talla Bogue. This soil occurs on slopes of sufficient inclination to give good surface drainage, but the underdrainage is imperfect. Old fields contain many wide, shallow washes, often exposing the comparatively unweathered substratum.

The Houston clay in many places has a black surface layer several inches deep, and in many places the soil at the foot of slopes ranges from a black, granular clay to a brown clay loam. Many such spots are in cultivation, and where the drainage is good they are very productive. Most of the higher lying lands have suffered so much from surface wash that the greater part of the original black soil has been removed.

These are the "black prairie" lands which constituted so large a part of the ante bellum plantations in the northeastern part of the county. Originally they were nearly treeless, and the present growth consists chiefly of scattered oak and pine with much haw, wild crab apple, and plum. The open places afford excellent grazing. There is commonly a greater variety of grasses than on the sandy soils, and of much better quality. Bermuda grass, lespedeza, the "hop" clovers, and carpet grasses are well established in many places. Sweet clover thrives well, but is not widely distributed. Alfalfa has been sown experimentally and is said to have grown quite well for two or three years.

While this soil includes areas of the Montrose clay, many poorly drained spots, and innumerable old fields badly gullied and overgrown with pine, scrubby oak, and bushy haw trees, it also embraces some very fertile patches on the higher ground. The numerous little branch bottoms, where the dark loamy soil easily yields to tillage, often produce 50 or 60 bushels of corn or 1 bale of cotton per acre.

This soil has high possibilities for the production of grasses, but practically no attention has been given the establishment of desirable pasture plants or the cultivation of forage crops. Some of this land has been recently fenced into large pastures. The larger creeks flow the entire year, but the small branches are usually dry during the summer.

### CAHABA VERY FINE SANDY LOAM.

The surface soil of the Cahaba very fine sandy loam is a light-brown to reddish-brown very fine sandy loam 5 to 10 inches deep. The subsoil is normally a moderately friable to slightly stiff reddish-yellow to red fine sandy clay, becoming more yellowish with depth, but in places there is between the soil proper and subsoil a layer of heavier fine sandy loam extending to a depth of 12 or 15 inches. The lower subsoil shows considerable variation, being in many places a sandy loam, or at least more sandy and open in structure than the upper subsoil and in others a heavy fine sandy clay. The subsoil of some imperfectly drained depressions and flats tends toward a yellow color or toward the character of the Kalmia very fine sandy loam.

As a rule both surface and internal drainage are sufficient, but not excessive.

Some included areas consist of Cahaba fine sandy loam, as, for example, the one lying on a slight elevation of a low terrace one-half mile east of Taylorsville. Here the soil consists of a brown to dark-brown fine sandy loam, grading at 3 or 4 inches into brown fine sandy loam, and then abruptly into a reddish-yellow fine sandy loam. At 12 to 15 inches there appears a yellowish-red friable fine sandy clay, which grades into yellow fine sandy loam somewhat mottled with gray and reddish yellow.

The type occurs on the high bench lands of the larger streams. It is usually best developed along the outer or streamward margin and farther back merges into the Kalmia types. The surface is slightly uneven, but with no sharp slopes except the short decline to the adjoining bottom lands. The elevation above the bottoms ranges from 10 to 40 feet.

The Cahaba very fine sandy loam in its typical development has excellent physical properties, endures wet and dry weather well, and is easily kept in good tilth. The lighter colored variations are not quite so tolerant of excessive rain, consequently work thereon is sometimes delayed and crops are somewhat backward. Some of this type was included in the land first cleared along the rivers, and many old fields are very deficient in organic matter, the slopes eroded down to the red clay, and the interior low spots undrained, so that the land is considered poor, but all could be brought again into good tilth.

The soil responds very promptly to fertilizers containing nitrogen and phosphorus. The red variation, which really represents an in-

clusion of Amite very fine sandy loam or fine sandy loam, is about as early as the Orangeburg soils; the lighter colored spots are somewhat later. Cotton, corn, cowpeas, and velvet beans are very successfully grown, and winter oats do well. The marginal areas are generally selected for farmsteads and gardens.

### CAHABA LOAM.

The Cahaba loam is a somewhat variable type occurring on the lower terraces of Leaf River in the vicinity of Taylorsville. The narrow areas near the river, termed "hammock" land, represent included low ridges of dull-brown or reddish-brown sandy loam, or loam, over red to yellowish-red, moderately heavy sandy loam. The lightest variations usually occur on the higher ground, and the heavier soils with yellowish-brown or mottled yellow and brown subsoil prevail in local depressions and wherever the type joins areas of the Kalmia or Leaf soils. Occasional patches consist of light reddish brown loamy sand of considerable depth.

The areas east of Leaf River are mostly low terraces, with a somewhat uneven or "ridgy" surface, on which the soils range from nearly typical Cahaba loam or silt loam on the higher ground, to Kalmia fine sandy loam or loam on the lower locations. All areas have fairly good drainage.

The typical Cahaba loam, as seen along Leaf River east of Taylorsville, is a rich-brown loam grading into lighter brown loam, which at about 10 inches passes into reddish-yellow friable silty clay, extending in the lower subsoil into yellow or only slightly reddish yellow, somewhat stiffer silty clay. Within a short distance of Taylorsville the type varies, the soil becoming a rich-brown loam, grading at 3 to 5 inches into reddish-brown or brownish-red heavy loam, extending to 10 inches. Below this appears a red moderately friable silty clay containing some fine sand, which passes down into yellowish-red silty clay, and in the lower subsoil into reddish-yellow silty clay, becoming quite sandy and friable below 3 feet. This variation would have been mapped as Amite loam if important areas had been found. The tree growth on the typical loam at this point consists of pine, white oak, magnolia, dogwood, and other hardwood species.

About 3½ miles northwest of Taylorsville, on a higher terrace, a small area of Cahaba loam, not outlined on the soil map, consists of a grayish-brown to yellowish-brown light loam ranging close to fine sandy loam, passing at 8 inches into reddish-yellow heavier loam, at 12 inches into red friable fine sandy clay, and at about 28 inches into yellowish-red friable fine sandy loam.

A small included area of Cahaba loamy sand about four-fifths mile east of Taylorsville consists of a rich-brown loamy sand, passing at 8 to 10 inches into brownish-yellow loamy sand and this grading into reddish-brown or reddish-yellow loamy sand.

There are occasional low sandy areas of a few acres, which are a brown or brownish-red loose sand over a dull-red sandy loam subsoil. These are warm early soils, most of which have been in cultivation many years.

All this type, with the exception of small included spots of poorly drained ground, is well adapted to tillage. All of it produces well;

the darker areas and those near the river bank are especially productive and yields of 25 to 40 bushels of corn are often obtained. Alfalfa probably could be successfully grown where the subsoil is well drained.

### KALMIA VERY FINE SANDY LOAM.

The virgin soil of the Kalmia very fine sandy loam is a gray or moderately dark gray very fine sandy loam, which changes at a depth of 2 or 3 inches into pale-yellow very fine sandy loam, and at about 12 to 16 inches into pale-yellow fine sandy clay, mottled, especially in the lower subsoil, with gray, and having a friable nature. Below 20 or 30 inches somewhat compact fine sandy clay or heavy fine sandy loam frequently appears, this layer impeding internal movement of moisture and air. The lack of air circulation is indicated by the prevalence of grayish and pale-yellow mottling, and the presence of concretionary material in this compact material. Where it is well developed the compact stratum usually extends to a depth of 8 or 10 feet, there giving way to loose water-bearing sand.

The soil and subsoil are very acid. Under tillage the soil becomes light yellowish gray to brownish gray, being lighter colored in local depressions where the drainage is less effective.

This is the dominant type on the higher terraces of the larger streams. The terrace on which Taylorsville is situated is from 30 to 40 feet above the river channel. The terraces farther north are not so high, and on most of them the somewhat uneven surface has a very slight slope toward the river. Usually the slope is sufficient to insure a flow in the ditches necessary to drain the many slight depressions.

The areas near Ted are high, gently inclined terraces on which natural drainage lines are quite well developed. On small areas in various other parts of the county the surface soil varies from reddish brown to light gray, according to local drainage, the former prevailing on the margins of the areas, the latter in the flatter interior portions. The reddish soil, of course, is not Kalmia, but an inclusion of Cahaba, Amite, or Chattahoochee, according to the color of the soil and subsoil.

A considerable part of this type is in cultivation. Its ease of tillage and freedom from excessive washing offset to some extent the lack of natural drainage. In favorable seasons cotton yields well, but in wet seasons it is likely to be too late to be safe from the boll weevil. Fertilization is necessary, except on new ground, and the use of acid phosphate in rather liberal quantities, and some nitrogenous fertilizer, gives good results. Sugar cane, most truck crops, and cowpeas and velvet beans do well on all except the lightest colored spots. This soil is not well adapted to corn, but oats do well unless excessive winter rains occur.

It is very probable that tile drains could be installed to advantage. They should be so placed that the laterals would not be more than 8 or 10 rods apart, except where the more sandy phases of the subsoil are found. Open ditches can not be placed close enough for effective drainage without interfering too much with cultural operations.

Included areas of Kalmia fine sandy loam, such as that 5 miles east of Raleigh on the Leaf River, consist of a gray to yellowish-brown or

yellow fine sandy loam passing at 3 to 6 inches into yellow or mottled gray and yellow heavier fine sandy loam and at 10 to 15 inches into yellow or pale-yellow fine sandy clay, mottled in places with gray, bluish gray, or shades of yellow. The lower subsoil is locally somewhat compact and mottled yellow, reddish yellow, and gray or bluish gray, and contains reddish-brown and rusty-brown concretions. These concretions also are present in places from the surface down, particularly in the more poorly drained depressions where the type tends toward the Myatt fine sandy loam. In places the surface soil is a gray loose fine sand grading into pale-yellow fine sand, underlain at 12 to 15 inches by a subsoil of yellow to reddish-yellow friable fine sandy clay passing into pale-yellow fine sandy clay. In some areas this is compact and mottled with gray below about 30 inches; in others it is more sandy than the upper subsoil. This variation, which represents a gradation toward the Cahaba fine sandy loam, occurs in the better drained situations, where oxidation has reached a more advanced stage.

Shortleaf pine, willow oak, white oak, sweet gum, black gum, maple, beech, ironwood, hickory, holly, azalea, yellow jasmine, and star anise are common plants on this type, much of which is in forest.

*Kalmia very fine sandy loam, low-terrace phase.*—The low-terrace phase of the Kalmia very fine sandy loam embraces the low gently sloping lands bordering the first-bottom soils of the larger streams. The terraces are not very well defined, although lying for the most part above overflow. The surface is usually very gently inclined toward the streams. Where tributary streams cross these areas, the soil, consisting largely of recent sediments, is fertile, but drainage conditions are poor. On the higher ground the soil resembles that of the typical soil. In local flats it grades into the Myatt fine sandy loam or silt loam. The areas along the small branches are essentially high first bottoms, seldom overflowed, and locally too flat to have as good drainage as the best first-bottom soils. Most of this phase is uncleared, but there are numerous small fields on which excellent crops are grown.

### MYATT FINE SANDY LOAM.

The Myatt fine sandy loam is a second-bottom type characterized by flat surface, poor drainage, and light color. In most places there is a thin surface layer of dark, partly decomposed organic matter, mixed with gray sand grains. Immediately below this is a light-gray fine sandy loam or a silty very fine sandy loam, mottled here and there with yellowish brown. The subsoil proper is a very light gray fine sandy loam or silty very fine sandy loam to fine sandy clay, soft and adhesive when saturated, clammy when moderately moist, and tending to a compact mass when dry. In all moisture conditions it is lacking in the "grain" or "crumb" structure of the darker colored types. The lower subsoil in places is a compact silty loam or very fine sandy clay that offers considerable resistance to the downward movement of water. Yellow and rusty-brown mottlings are common, and in many places small dark-colored concretions are present throughout the entire 3-foot section.

In the included areas of Myatt very fine sandy loam, such as that in the slight depression of the Leaf River terrace one-half mile east

of Taylorsville, the surface soil consists of an ashy or dark-gray very fine sandy loam, 2 or 3 inches deep, overlying light-gray or whitish very fine sandy loam, slightly mottled with pale yellow. This passes at 8 or 10 inches into mottled light-gray and pale-yellow fine sandy clay, which at 15 to 20 inches passes into plastic, heavy impervious clay, mottled with gray and pale yellow.

The soil on a terrace of Leaf River, about 2 miles east of Taylorsville, is a black fine sandy loam, underlain at 3 to 6 inches by gray fine sandy loam, which passes abruptly into pale-yellow and light-gray or bluish-gray fine sandy clay, the gray increasing with depth. This represents an area of Okenee fine sandy loam which has been included with the Myatt fine sandy loam on account of its small extent.

The Myatt fine sandy loam occurs on flats and shallow local depressions of the second bottoms. In many places it is associated with the Kalmia very fine sandy loam, and all the larger areas of the latter type include some of the Myatt soil. It is characteristically developed on the terraces along Leaf River near Pineville. Small areas, some including ponds occupied by tupelo gum trees, occur in many places in the lower part of Leaf River Valley and on Oakohay Creek. The vegetation includes much shortleaf pine, water oak, and post oak, with occasional trees of longleaf pine and the better varieties of oak.

Very little of the type is in cultivation. Most field crops do well on artificially drained land if the season is not wet. Lespedeza, sorghum, and sugar cane do better than other crops. Corn does very poorly, and cotton tends to rust, besides being very subject to injury by the weevil. Water moves laterally rather slowly, and consequently ditches are less effective than on the darker colored soils of similar texture.

Considering present prices of better land, it appears inadvisable to use this type for cultivated crops. Old clearings should be devoted to pasture, and the rest should remain in forest or be reforested with pine.

### LEAF LOAM.

The Leaf loam as mapped in this county is a somewhat variable type with respect to surface soil, but in all places it has a heavy, plastic subsoil. As a rule the soil is a light-brown to dark-brown heavy loam or silty loam, underlain at about 6 to 8 inches by red or reddish-yellow to yellow silty clay, which passes below into stiff, plastic clay, mottled red and light gray or bluish gray and yellow. In the lower subsoil bright-red, brownish-red, and yellowish-brown stains are numerous. In many instances the mottling is striking in the brightness and variety of colors. In places the type includes brown silt loam and loam about 3 inches deep, overlying brownish-yellow silt loam or loam, which at 5 or 6 inches passes into reddish-yellow to yellow silty clay, grading down into red and yellow or reddish-yellow and gray plastic silty clay.

There are also included patches of Leaf very fine sandy loam, one of which lies three-fourths mile east of Taylorsville on a lower terrace of Leaf River. Here the soil consists of light-brown very fine

sandy loam, passing at 3 to 5 inches into pale-yellow very fine sandy loam, and at 10 to 12 inches into mottled yellowish-red and light-gray friable fine sandy clay. This at 15 to 20 inches grades into mottled red and light-gray plastic clay, which passes rather abruptly into sticky, plastic red clay mottled with yellow and below 24 inches with light gray and yellowish gray. Some areas closely approach in character the Cahaba soils.

This type has an irregular distribution in the Leaf River Valley below the mouth of West Tallahala Creek. Most of it lies slightly above ordinary overflow. It seems probable that this is an old alluvial soil derived chiefly from the calcareous clays along the creek. If so, the influence of the lime has long since disappeared, for surface soil and subsoil are acid. On much of this type there is still a heavy growth of hardwoods of such variety and quality as to indicate an inherently fertile soil.

Very little land of the heavier variations of this type is now in cultivation, but there are some old fields, cleared many years ago, on which grass thrives, and on which the forest has not encroached to any extent. Most of the fields in cultivation are lighter variations of the type, loams or sandy loams, and on some of the fields east of Taylorsville the surface soil is brown or reddish brown. On these variations cotton, corn, cowpeas, and velvet beans do well. Fall-sown crops are hardly safe, except on the highest parts of the somewhat uneven surface, because water escapes very slowly where the land is flat. Most of this type is better adapted to grass and legumes than to cultivated crops.

The following table gives the results of mechanical analyses of samples of the soil, subsurface, and subsoil of the Leaf loam:

*Mechanical analyses of Leaf loam.*

| Number. | Description. | Fine gravel. | Coarse sand. | Medium sand. | Fine sand. | Very fine sand. | Silt. | Clay. |
|---|---|---|---|---|---|---|---|---|
| | | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* |
| 424539 | Soil, 0 to 2 inches | 4.3 | 1.9 | 2.0 | 18.2 | 8.7 | 44.5 | 20.2 |
| 424540 | Subsurface, 2 to 8 inches. | .2 | 1.0 | 1.6 | 19.4 | 11.2 | 36.9 | 28.8 |
| 424541 | Subsoil, 8 to 24 inches. | .0 | .7 | 1.4 | 17.3 | 8.8 | 29.9 | 41.9 |
| 424542 | Subsoil, 24 to 36 inches. | .4 | 1.5 | 2.1 | 17.4 | 8.6 | 25.5 | 44.4 |

OCHLOCKONEE FINE SANDY LOAM.

The Ochlockonee fine sandy loam, as mapped in this county, includes the sandy alluvial land having at least 8 or 10 inches of surface soil of pronounced brown color. The subsoil is generally heavier in texture than the surface soil and more or less mottled, gray, brown, and rusty brown being the more common colors. As a rule the lower subsoil is rather light colored, in places bluish gray with but little mottling. Small concretions and brown and yellow concretionary material are very commonly present, especially in those areas having a heavy subsoil.

The depth to which the brown color prevails is an almost infallible indication of drainage conditions. The dark-brown color in the

more silty areas and the reddish-brown color in the sandy ones indicate good drainage and thorough aeration, conditions favorable to the growing of cultivated crops. Gray, bluish-gray, and very light drab colors indicate almost constant saturation. In estimating agricultural values of this alluvial soil, texture, surface inclination, proximity to well-defined stream channels, and the volume of water that must pass must all be taken into consideration. These factors vary much locally and almost every field near the larger creeks and each little branch bottom contains a variety of soils. In these locations mapping in detail is impossible, and only the prevailing type may be indicated.

In the northeastern part of the county the Ochlockonee fine sandy loam includes numerous patches of Bibb soils, ranging in texture from sandy loam to silt loam. Probably a larger proportion of the type has a mottled lower subsoil than in the silt loam.

In the Leaf River bottoms east of Raleigh the Ochlockonee fine sandy loam is a brown fine sandy loam grading at an average depth of about 10 inches into yellowish-brown fine sandy loam and this into yellow friable fine sandy clay, showing little or no gray mottling in the 3-foot section.

A considerable proportion of this type is mottled in the lower subsoil. Much of the type having the mottled subsoil has also a very compact hardpanlike layer at about 30 inches, including an abundance of dark-colored and rusty-brown concretions and concretionary material. Such soil occurs in the bottoms at Milton and in the outer edge of the Oakohay Creek bottoms at Mize. Here the soil is a brown to light-brown fine sandy loam 10 or 12 inches deep, overlying yellowish-brown fine sandy loam, which contains an abundance of gray or bluish-gray mottling below 24 inches, where the texture ranges from heavy fine sandy loam to fine sandy clay. At about 30 inches concretions and concretionary material are plentiful and the material is compact and impervious, a true hardpan in places. The drainage of this variation, however, is sufficient for the production of fair to good crops of corn when the rainfall is not too heavy. It is soggy and miry in wet weather, but this condition can be improved by ditching or tiling.

Within the larger areas of Orangeburg soils a good deal of loamy sand has accumulated along the "draws" or wide, shallow drainage ways. This soil, which has been included with Ochlockonee fine sandy loam, is very fertile and in some seasons yields as much as 1 bale of cotton or 40 to 50 bushels of corn per acre.

Under favorable conditions corn yields 40 or 50 bushels per acre on the darker colored variations of the type in the creek bottoms, but overflows quite frequently reduce the yields. Torrential summer rains especially are a menace, and in some instances nearly all the soil turned up by the plow may be swept off the lower part of the field.

Fall-sown crops are reasonably safe on the highest ground, usually near the base of the uplands or on some exceptionally high sandy "hammock" which forms a low second bottom. Many locations are suitable for sugar cane or sorghum, and the quality of the sirup produced is good. All the type is well adapted to carpet grass, Ber-

muda grass, and lespedeza. Johnson grass is rarely sown and there is little of it anywhere, but it thrives on the heavy variations of the type.

Many of the small "hill" farms include branch bottoms in which the tillable land consists of this type. Very frequently it is a field of only a few acres, or a somewhat larger field traversed by the crooked creek channels, but all is cultivated. A very large proportion of corn, nearly all the sugar cane, and sometimes all the sweet potatoes on a farm are grown on this sandy alluvial type.

### OCHLOCKONEE SILT LOAM.

The Ochlockonee silt loam as mapped in this area includes the dark-brown silty soils which so generally prevail near the banks of the larger streams. In its typical development the surface soil is a dark rich brown, mellow silt loam. On the immediate banks or near old channels this friable brown material may extend to depths of 20 to 30 inches, but generally it is less than 10 or 15 inches deep. The subsoil is lighter in color, and locally the lower part of the 3-foot section is a gray or bluish-gray silt loam or silty clay, which is mottled more or less with rusty brown and yellow and contains iron concretions and soft concretionary material.

The typical Ochlockonee silt loam, such as that in the bottoms of Leaf River on the Raleigh-Sylvarena road, is a deep-brown silt loam grading at about 10 inches into lighter brown silty clay loam and below this into yellowish-brown silty clay, which shows no important change to a depth of 3 feet or more.

Farther up the Leaf River near the first bridge above the Raleigh-Sylvarena road the lower subsoil is a plastic silty clay mottled yellowish and bluish gray. A large proportion of the Ochlockonee silt loam, such as that in the Oakohay Creek bottom west of Raleigh, and along a smaller creek 3½ miles east of Trenton, consists of brown silt loam passing at about 8 to 12 inches into light-brown silt loam or silty clay loam, which, in turn, passes into yellowish-brown or yellow silty clay loam or silty clay, and this into mottled yellowish and gray or bluish-gray silty clay loam or silty clay, containing commonly some rusty-brown and dark-colored concretions and concretionary material. Locally this lower mottled subsoil is compact at depths of 26 to 36 inches, in places having the nature of a hardpan. Thus the type as mapped here, and as it has been mapped in most other areas, includes this distinct variation—a soil having a mottled and often compact lower subsoil like the subsoil of the Bibb types. Such soil represents a gradation between the typical Ochlockonee and the typical Bibb. It could be recognized as belonging to a different series, but no such series has been established because this soil generally occurs in patches in intimate and intricate association with the typical soil, so that to show it separately would require large-scale, slow mapping under such unfavorable conditions as frequent overflow and the presence of a dense swampy growth over a large part of the tpye. Even patches of the gray Bibb soils, which are less productive than the mottled-subsoil phase of the Ochlockonee, have been included with the Ochlockonee in many

places owing to the impracticability of satisfactory separation. In this area numerous patches of Bibb silt loam have been included with the Ochlockonee silt loam on the soil map, and vice versa. The rule followed has been to map the predominant soil.

The Ochlockonee silt loam is subject to periodic overflow. The typical soil is well drained between overflows. The mottled-subsoil variation does not have as good underdrainage, but is sufficiently well drained for successful crop production, although not so good average results may be expected from it as from the typical soil. The surface in places is hummocky, and many of these hummocks, especially near the banks of streams and abandoned channels, are lighter textured, consisting of Ochlockonee fine sandy loam, very fine sandy loam, and loam. There are also shallow depressions including Bibb silt loam and the mottled subsoil phase of Ochlockonee silt loam; and deeper depressions representing former stream channels, in some of which water stands the year around.

The material, particularly of the surface soil, is of recent deposition. Along the smaller streams it is derived chiefly from areas of Orangeburg and Ruston soils; along the rivers it comes from more varied sources, but the difference is not easily discernible, as the soils have about the same appearance under similar conditions of local drainage. The organic matter is well distributed throughout the surface soil and never occurs as a thin surface layer as in the Bibb soils. This is due in part to the origin of the soil, but chiefly to the deep and thorough aeration that occurs in proximity to these deep channels and on the slight elevations or "hammocks." The occurrence of a sandy substratum in some places may also induce better drainage.

As a rule, the darker variations of Ochlockonee soil do not extend back from the stream channels more than one-eighth mile, in places only a few rods. Less typical soil, gradations between the Ochlockonee and Bibb soils, generally prevails for some distance away from the streams, or occurs wherever slight elevations have been built up or where an affluent stream has modified the surface conditions. As mapped the Ochlockonee silt loam includes some Bibb silt loam and patches of other types. The Ochlockonee silt loam and included patches of fine sandy loam are locally termed "hammock land."

A heavy and varied forest growth, which included nearly all the deciduous trees found in this section of the State, formerly occupied this type. Much of this remains, but most of the finest of the oak, hickory, poplar, and ash trees have been removed. Switch cane and magnolia trees have a distinct preference for the Ochlockonee as compared with the adjoining Bibb soils. Formerly there was much wild cane, but it has been reduced to occasional patches. The pines and small shrubs form a dense growth in many places that otherwise might be sufficiently open to admit of some grassy undergrowth.

The present vegetation includes magnolia, willow oak, swamp white oak (or overcup oak), sweet gum, black gum, ironwood, maple, dogwood, holly, bay, buckeye, silver bell, beech, swamp pine, star anise, yellow jasmine, poison ivy, cross vine, smilax vine (or "bamboo"), grape vine, switch cane, and azalea. Near the banks of streams there is some sycamore, alder, birch, and willow, and through the swamp shell-bark hickory and "laurel" are found in places. Cypress and tupelo occur in wet abandoned channels.

Carpet grass and lespedeza flourish in cleared areas. In the forest two very early swamp grasses provide early grazing. Bermuda grass is grown with much success in some parts of the South on this and similar bottom land, affording excellent hay and pasturage for cattle, horses, and hogs. By clearing off the trees this land could all be used for pasture and a very large proportion of it could be used for the production of lespedeza and Bermuda grass hay without any very expensive drainage operations. It is said that stumps rot out rapidly in these bottoms.

Only small areas of this type have been cleared. As a rule they are small "hammocks," either on the bank of the stream or a sandy ridge of slight elevation above the surrounding "swamp." Good yields of corn are obtained, provided a late overflow does not occur. As a rule the floods of all the larger streams occur in the winter and spring, but summer floods are not unknown. Cotton produces a large plant, but matures late, and the boll weevil is very destructive, especially in wet years.

### OCHLOCKONEE SILTY CLAY LOAM.

The surface soil of the Ochlockonee silty clay loam is a brown silty clay loam or silt loam passing at a depth of 1 or 2 inches into a lighter brown or yellowish-brown silty clay loam. At depths of 12 to 20 inches yellowish-brown to yellow silty clay is reached in places, but in other places the subsoil is a silty clay loam throughout the 3-foot section. Locally the lower subsoil shows mottlings of gray, and in places it is somewhat compact and contains rusty-brown concretions and concretionary material. In some places mottled material like that of the Bibb soils is reached at depths of not more than 15 or 20 inches.

Patches of Bibb silty clay loam are included in the more poorly drained situations. This is a mottled gray and brown or rusty-brown silty clay loam passing down into light-gray or bluish-gray silty clay loam or silty clay mottled with pale yellow and containing rusty-brown and black concretions and concretionary material. A compact hardpan or hardpanlike layer forms the lower subsoil. On hummocks and near the banks of streams and abandoned channels there are included patches of Ochlockonee silt loam, loam, fine sandy loam, and very fine sandy loam.

The Ochlockonee silty clay loam occurs along the Strong River occupying about the same relationship to the river as the Ochlockonee silt loam does to Oakohay Creek. Like the latter, it merges into the light-colored Bibb soils at no great distance back from the channel, or wherever the surface is flat. The heavy character of the sedimentary clay may be due to the drainage from soils of limestone origin reached by the upper tributaries of the river. This soil is probably acid.

This type is in heavy forest, and practically none of it is tillable, owing to frequent overflows. Lespedeza and carpet grass could be grown successfully for pasturage and hay, after the removal of the forest, but it may be as profitable in the long run to use this heavy and rather swampy type of bottom land for timber production. Fire protection will not be necessary for reforestation, as this will take care of itself. If cleared and drained, corn and grass likely will be the most profitable crops, although rice, oats, cotton, sugar cane, sorghum, and various forage crops could be grown.

### BIBB FINE SANDY LOAM.

The Bibb fine sandy loam as mapped in this county includes the light-colored alluvial soils, which are predominantly sandy. The surface soil ranges in texture from a silty very fine sandy loam to a moderately coarse sandy loam and in color from gray to rusty brown. The upper subsoil is generally a light-gray or in places a bluish-gray silty clay or fine sandy clay. The lower subsoil is similar in texture but usually more compact, and is more or less mottled with yellow, brown, and rusty brown. In places where the subsoil is almost constantly saturated, bluish gray is the characteristic subsoil color, while gray with brownish mottlings marks the places where the subsoil is alternately saturated and dry. Fairly good drainage conditions are indicated by greater depth of brown surface soil, which often grades into the Ochlockonee sandy loam, patches of which occur in all the areas mapped as Bibb fine sandy loam.

The type as mapped includes some Bibb silt loam and very fine sandy loam and Ochlockonee silt loam, fine sandy loam, and very fine sandy loam.

The outstanding features of the type are the poor natural drainage, light color, and the cold, "clammy" nature of the soil material. The meager content of organic matter is confined to the first few inches of surface soil, except in occasional instances where shallow muck has developed over the gray subsurface material.

Areas of this type occur along nearly all small streams originating in the sandy upland regions. Its occurrence is most common in the narrow branch bottoms where Ruston and Susquehanna soils form most of the adjacent uplands. Fair-sized areas are found along Ichusa Creek and along the upper tributaries of Leaf River. Small patches occur in larger creek bottoms and along the margin of the low-terrace phase of the Kalmia very fine sandy loam.

This type is not considered a very productive soil, and very little of it is in cultivation. It is not only subject to overflow, but is soggy and wet during most of the year. The most desirable areas are those grading into the Ochlockonee soils. Lespedeza and carpet grass thrive on cleared ground. Sugar cane and sorghum do well, and fall-sown oats, if not injured by winter overflows, often make satisfactory yields. When the rainfall is not too heavy fair to good crops of corn are produced, especially where the land is properly ditched. Bermuda grass probably will succeed. It appears that the best use to which much of the land in these "gray bottoms" can be put is for timber production or for pasture and hay land.

By far the greater part is uncleared. The forest growth includes bay, magnolia, swamp pine, soft maple, ironwood, holly, sweet gum, and black gum, with cypress and willow in the wet places. The undergrowth consists of star anise, azalea, silver bell, yellow jasmine, cross vine, and many other kinds of vine. There is some wild cane and several early swamp grasses that add to the value of the grazing.

### BIBB SILT LOAM.

The Bibb silt loam, as mapped in this county, includes those wide, flat bottom lands known locally as "slash land" or "water-oak land" and always embraced in the more general term "swamp."

During the winter water often stands over the surface for weeks at a time, but in the late summer the soil usually becomes dry and hard. The long periods of saturation are indicated by the light color.

To a depth of 5 or 6 inches the soil of the Bibb silt loam is a light-gray silt loam, more or less stained with dull yellow and yellowish brown. Below the surface layer, and extending to a depth of 20 to 30 inches, the material is a light-gray silt loam or silty clay loam, mottled with yellow and yellowish brown and containing much soft, concretionary material of similar color. The lower subsoil is usually a compact bluish-gray clay or silty clay, with less segregation of the iron content into stains and soft, concretionary material than in the upper subsoil. This lower subsoil is so nearly impervious that in many places it is only moist, while the overlying material is soft and miry. There is noticeable lack throughout the 3-foot section of the crumbliness or "grainy" structure characterstic of a normal soil. All this type suffers long periods of saturation each year, owing to its flat surface and the high average level of the water table throughout the valleys in which the type is found.

This is the predominant soil of the valley of Oakohay Creek and its larger tributaries, particularly those from the west. As mapped it includes some "hammock" lands or small areas of brown silt loam in which the slightly higher surface and more sandy nature of the material gives better drainage. The boundary between the Bibb silt loam and Ochlockonee silt loam is arbitrarily drawn, but indicates the relative position of the type. Some small areas of Bibb silty clay loam have been included with the type as mapped.

Practically none of the Bibb silt loam is cultivated. The frequent overflows and inherently poor moisture conditions render it untillable. The heavy forest growth includes white oak, water oak, post oak, hickory, beech, holly, sweet gum, black gum, soft pine, and many other varieties of trees and bushes. There is very little switch cane and not a great deal of grassy undergrowth. Most of the best timber has been removed.

The present price of most of the land may be placed at about $5 an acre, where no considerable amount of desirable timber remains.

Where most of the timber has been removed, comparatively simple surface drainage is all that is necessary to render the soil suitable for lespedeza and carpet grass; in fact, these crops would thrive over much of the type without any additional drainage if the forest were removed. The use of this soil for forestry is an economic possibility worth considering.

### BIBB CLAY.

The typical Bibb clay is a light-gray to mottled brown, gray, and yellow clay, which passes into ashy-gray or whitish plastic clay, mottled in places with yellow or reddish yellow. On the numerous hummocks the immediate surface soil has considerable brown color or is a brown clay loam passing at a few inches into mottled brown, gray, and yellow silty clay, while in the wetter depressions the immediate surface soil may be mottled bluish gray and rusty brown. Bluish gray is the dominant subsoil color. In most instances the

lower part of the 3-foot section is a stiff tenacious clay, admitting of very poor underdrainage.

The Bibb clay is the prevailing type on the wide, flat bottoms of West Tallahala Creek, and as a rule extends well up to the banks of the stream. There is little development of lighter soils along the channel and not many low "hammocks" or sandy spots elsewhere.

The first-bottom land along Leaf River from Pineville northward consists chiefly of this type. Near the channel there is some Ochlockonee silt loam, but above the confluence of Talla Bogue and Turkey Creek and in the valleys of these tributaries, there are practically no silty or sandy soils. On the margin of the bottom lands there are occasional patches of slightly higher ground, where the soil approaches the Trinity clay.

The type is subject to frequent overflows, and during rainy seasons water escapes from the flat surface very slowly. With the exception of the higher marginal patches, none of this land is in cultivation. The forest growth is similar to that on the Bibb silt loam, except that there may be less water oak and beech. The rather dense forest, from which much of the larger timber has been removed, prevents the growth of grasses or of cane, and the pasturage is generally poor.

The following table gives the results of mechanical analyses of samples of the soil, subsurface, and subsoil of the Bibb clay:

*Mechanical analyses of Bibb clay.*

| Number. | Description. | Fine gravel. | Coarse sand. | Medium sand. | Fine sand. | Very fine sand. | Silt. | Clay. |
|---|---|---|---|---|---|---|---|---|
| | | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* |
| 424578 | Soil, 0 to 2 inches | 11.0 | 12.6 | 8.3 | 8.8 | 1.2 | 32.2 | 25.8 |
| 424579 | Subsurface, 2 to 6 inches. | .4 | 6.6 | 7.8 | 11.4 | 2.6 | 30.9 | 40.3 |
| 424580 | Subsoil, 6 to 24 inches. | .8 | 4.6 | 6.3 | 9.8 | 2.4 | 25.5 | 50.6 |
| 424581 | Subsoil, 24 to 36 inches. | .5 | 4.2 | 5.9 | 9.5 | 3.6 | 29.6 | 46.7 |

## CATALPA CLAY LOAM.

The Catalpa clay loam, as mapped in this county, is an alluvial soil derived chiefly from calcareous soils, but modified by very recent deposits from noncalcareous types. Mixed soils of this character occur on the east side of Leaf River from the Raleigh-Sylvarena road northward to Cedar Grove Church. As a rule the type is best developed in embayments of the valley, where lime-bearing strata outcrop on the adjacent slopes, and for some distance up the tributary streams. Formerly the sediments in such locations were mostly clay from the calcareous measures. Since so much of the adjacent upland has been cleared, more sandy deposits, in places in great volume, have been spread over the clay or mixed with it, forming soils of variable character, but generally with a heavy subsoil.

Near the foot of upland slopes occupied by the Oktibbeha clay and the Ruston and Kirvin soils, the surface of the Catalpa clay loam is more or less sandy, and the subsoil may be a yellowish-brown or mottled yellow and drab sandy clay. Farther from the slope the

surface soil becomes heavier and the subsoil is a stiff, heavy, bluish-gray silty clay loam or clay, in which the underdrainage is poor. The small areas on Ichusa Creek are mostly dark-colored heavy soils and include some small patches of Trinity clay.

The surface soil is invariably acid, and as a rule the subsoil is also distinctly acid. The only calcareous areas are those which are still receiving some sediment washed from the limestone soils.

The darker colored and higher lying areas are very desirable for corn, oats, cotton, and most of the legumes grown in this region. Corn sometimes yields 50 to 60 bushels per acre on such areas. The more sandy areas on Leaf River are very desirable for corn, cotton, and oats. The areas near the channel are subject to overflow, but usually a corn crop can be obtained.

### TRINITY CLAY.

The Trinity clay is a black waxy clay, underlain by equally heavy and even more adhesive clay of lighter color. The depth of the black surface layer varies from a few inches to 10 or 15 inches. When dry the surface soil cracks deeply and may assume a coarse granular structure. As a rule the soil is calcareous, and the lower subsoil contains a good deal of free lime.

Areas of this type too small to map occur on all the streams traversing the limestone soils of the northeastern part of the county, and as far south as Sylvarena on Leaf River and Ichusa and West Tallahala Creeks. As a rule the type is best developed just at the foot of hillsides occupied by the Houston clay. It is colluvial in part and generally lies above all but the highest overflows.

Most of this type is in cultivation. It is of little value for cotton, but yields of 50 to 60 bushels of corn are often obtained. The native grasses thrive especially well and afford good pasturage. Practically no alfalfa is grown, but there is much land sufficiently well drained and not subject to protracted floods on which alfalfa would do well. Sweet clover has been accidentally introduced and scattered bunches are found along Ichusa Creek and its tributaries.

Many small areas might be utilized if better protection from flooding of the main streams and short tributaries could be assured. This, however, is not easily accomplished. The most practicable use for such land is the growing of Bermuda grass and lespedeza.

Owing to the small size of the individual areas and their inclusion with other types in the farms, an estimate of the price of this land is hardly practicable. It is highly esteemed by the farmers.

### SUMMARY.

Smith County is situated in the south-central part of Mississippi, on the northern border of the longleaf pine belt. The surface is rolling to hilly, with rather small areas that are very rough. The drainage is toward the south. Leaf and Strong Rivers and Oakohay Creek are the largest streams, and with their many tributaries reach nearly every part of the uplands. The valleys of these streams are wide and flat.

Less than one-fourth of the total area of the county is under cultivation, most of the rest being forested. The population is largely

white. The farms, for the most part, are small and the methods of tillage are adapted to sandy, easily eroded soils, where light implements are preferable.

Cotton and corn are the chief crops. A considerable number of secondary crops, mostly for home consumption, are grown. Cattle and hogs are more important as supplying meat and other products on the farms than as a source of income. The local demand for most products is small, and cotton is the chief cash crop.

The soils are derived from Coastal Plain materials of Tertiary origin. Sand and sandy clay predominate through the southern and central parts of the county. Heavy clays, with some irregularly distributed sands overlying them are the chief soil-forming materials of the northern part. The Vicksburg limestone outcrops at a number of places in the central part, but gives rise to only small areas of Oktibbeha clay.

The Ruston and Orangeburg fine sandy loams predominate, and comprise much of the land now under cultivation.

The heavy upland types include Susquehanna, Kirvin, Montrose, Houston, and Oktibbeha soils. Excepting the Kirvin, these are not generally in cultivation.

The terrace types are Cahaba, Kalmia, Myatt, and Leaf soils. The Cahaba soils are largely in cultivation, and the Kalmia in part, but the other two are uncleared.

The wide bottoms of the large streams are nearly all forested. Here the predominant type is the Bibb silt loam. The Bibb clay and the fine sandy loam also occur.

The most important of the darker colored alluvial types are the Ochlockonee silt loam and the fine sandy loam. They are very fertile, but are generally untillable on account of the frequency of overflow.

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U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF SOILS
IN COOPERATION WITH THE
MISSISSIPPI GEOLOGICAL SURVEY

# SOIL MAP

MISSISSIPPI
SMITH COUNTY SHEET

## LEGEND

- Bibb fine sandy loam — B
- Myatt fine sandy loam — Ms
- Bibb silt loam — Bs
- Ochlockonee fine sandy loam — Of
- Bibb clay — Bc
- Ochlockonee silty clay loam — Om
- Caddo fine sandy loam — Cf
- Cahaba very fine sandy loam — Cv
- Oktibbeha clay — Oc
- Cahaba loam — Cl
- Orangeburg fine sandy loam — Of
- Catalpa clay loam — Cc
- Of Rolling phase
- Greenville loam — G
- Orangeburg and Susquehanna fine sandy loam (*Undifferentiated*) — OS
- Houston clay — Hc
- Ruston fine sandy loam — Rf
- Kalmia very fine sandy loam — Kv
- Rf Rolling phase
- Kv Low-terrace phase
- Rf Light-textured phase
- Kirvin fine sandy loam — Kf
- Rf Mixed phase
- Ruston and Orangeburg fine sandy loam (*Undifferentiated*) — RO
- Kf Stony phase
- Kirvin clay loam — Kc
- Ruston and Susquehanna fine sandy loam (*Undifferentiated*) — RS
- Leaf loam — Ll
- Susquehanna fine sandy loam — Sl
- Montrose fine sandy loam — Mf
- Susquehanna clay — Sc
- Montrose clay — Mc
- Trinity clay — Tc

## CONVENTIONAL SIGNS

CULTURE
(*Printed in black*)

City or Village, Roads, Buildings, Wharves, Jetties, Breakwater, Levee, Lighthouse, Fort

Secondary roads and trails

Railroads Steam and Electric

Bridges, Ferry

R. R. crossings, Tunnel

Ford, Dam

School or Church Cemeteries

Mine or Quarry Mine dumps Made land

Bluff, Escarpment, Rock outcrop and Triangulation station

Stony and Gravelly areas

Soil boundaries

Boundary lines

Boundary lines

Boundary lines

U.S. township and section lines

RELIEF
(*Printed in brown or black*)

Contours Depression contours

Prominent Hills Mountain Peaks

Sand, Wash, and Sand dunes

Shore and Low-water line, Sandbar

DRAINAGE
(*Printed in blue*)

Streams

Lakes, Ponds, Intermittent lakes

Intermittent streams

Springs, Canals and Ditches, Flumes

Swamp, Salt marshes

Submerged marsh, Tidal flats

*The above signs are in current use on the soil maps. Variations from this usage appear in some maps of earlier dates.*

Soils surveyed by W. E. Tharp, in charge,
and William De Young.

Scale 1 inch=1 mile

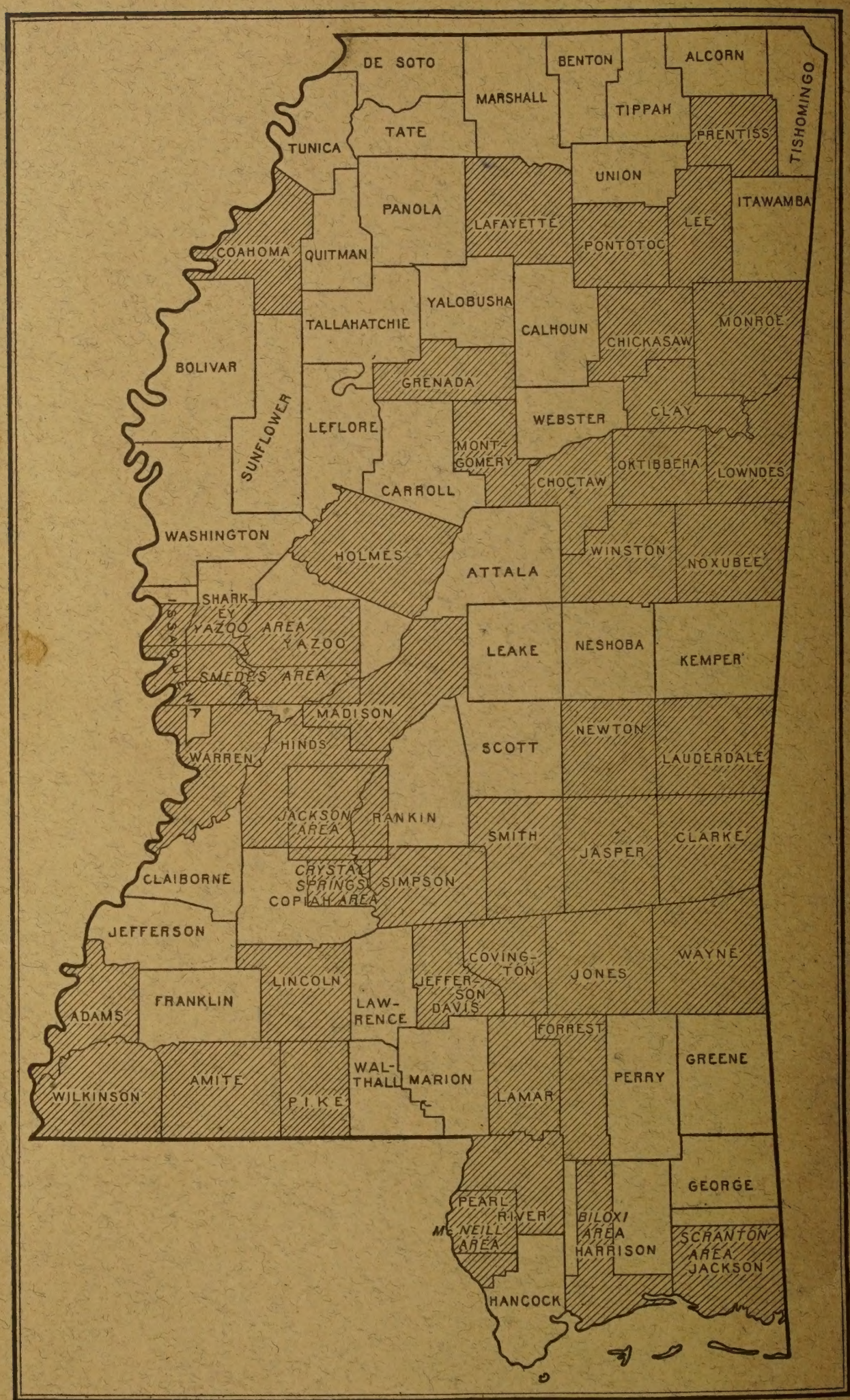
Field Operations
Bureau of Soils
1920

| 1 | U.S. Bur. soils. |
|---|---|
| So32F | Soil survey. |

Miss., Smith county.



GPO 8—2432




Areas surveyed in Mississippi, shown by shading.

Mississippi